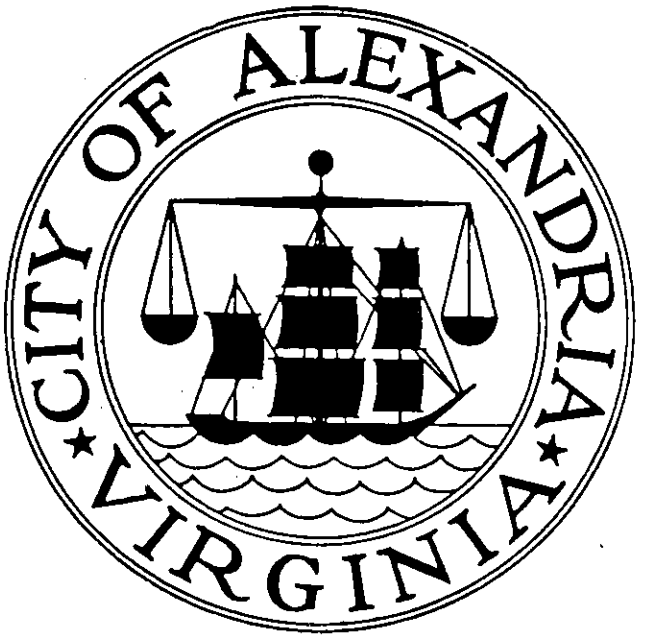
DESIGN AND CONSTRUCTION STANDARDS

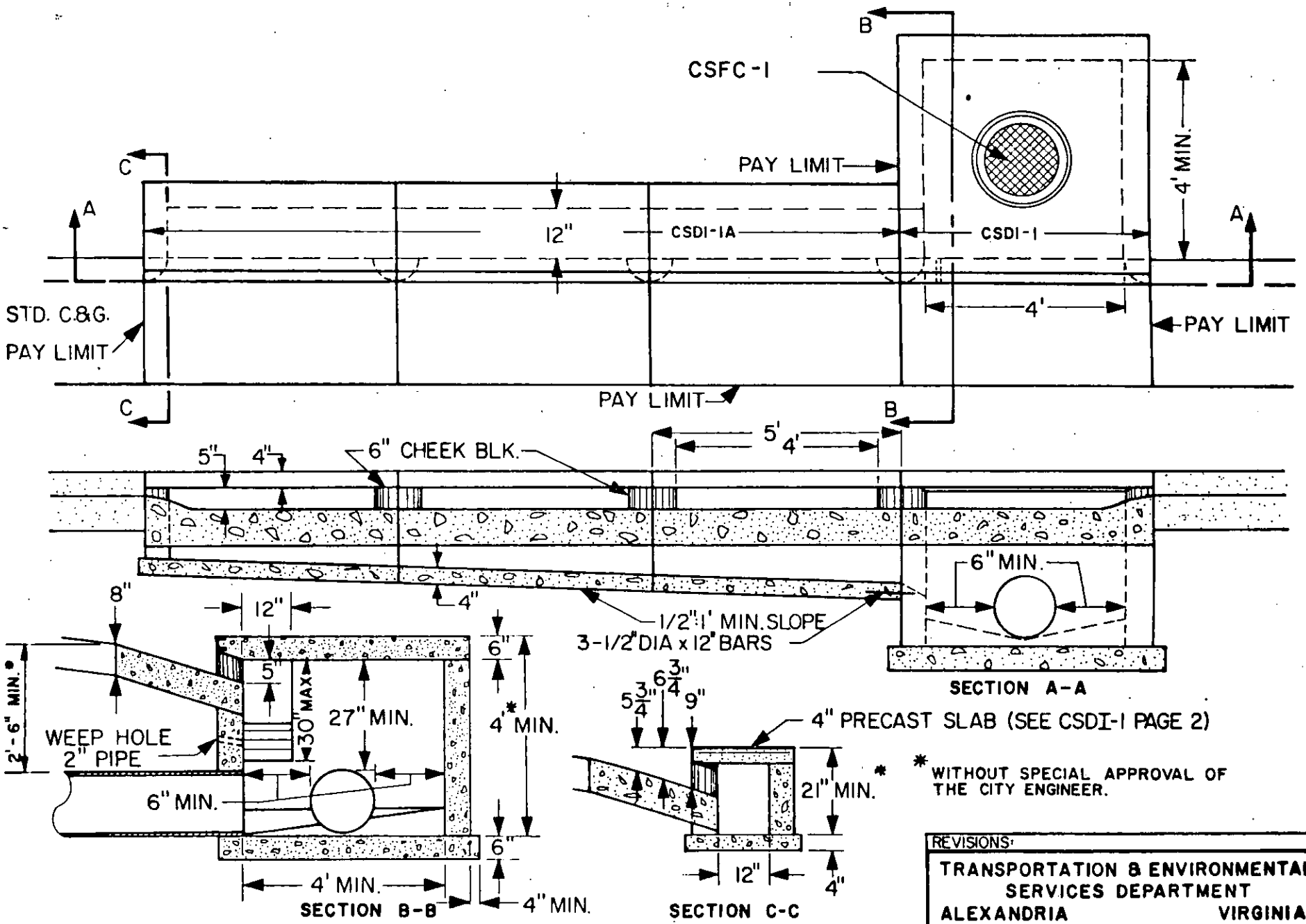


DEPARTMENT OF TRANSPORTATION
& ENVIRONMENTAL SERVICES

JULY 1989

TITLE SHEET

CONTENTS



NOTES: 1. WALLS OF POURED CONCRETE WILL BE 6" THICK. WALLS OF CONCRETE BLOCK WILL BE 8" THICK.

2. CONSTR. OF CLASS "A 3" CONC.

3. WALLS OF POURED, OR BLOCK CONCRETE, OR BRICK IN MORTAR WILL BE PARGED 1/4" INSIDE

4. CONSTR. WILL BE SUCH THAT UP TO 3 INLETS, TOTAL MAY BE ADDED.

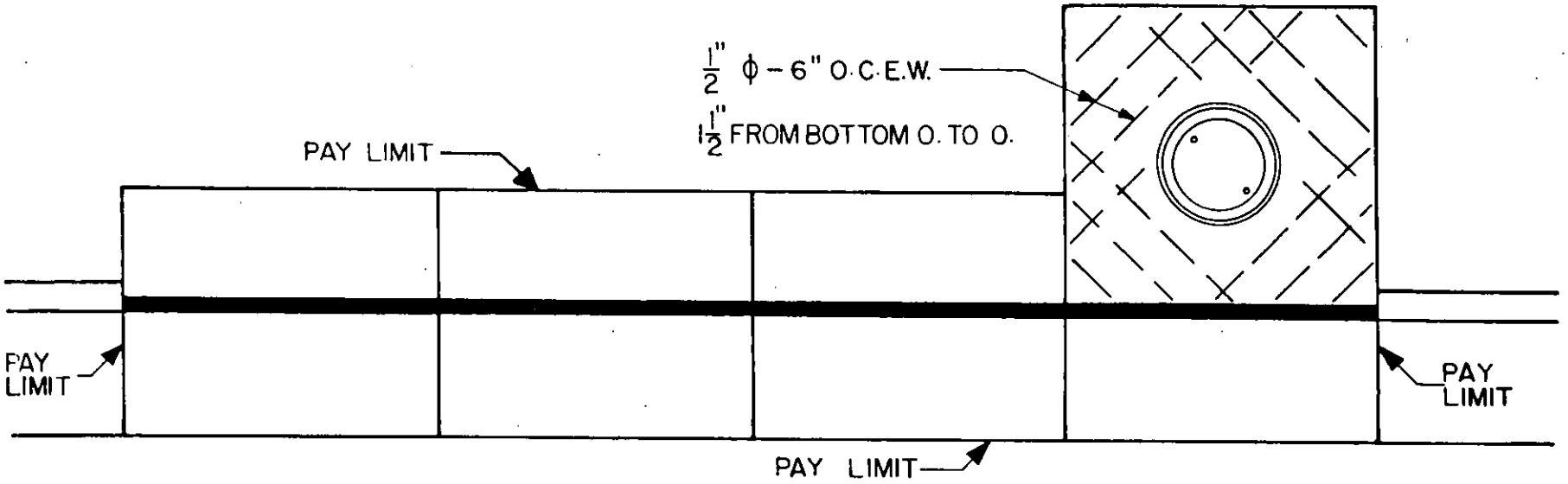
REVISIONS:

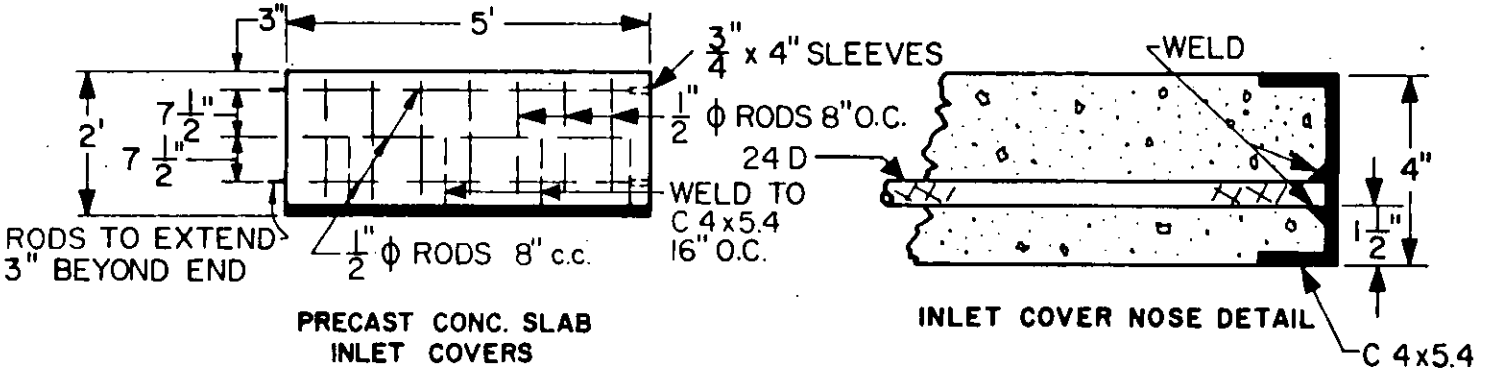
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

CURB DROP INLET

& ADDITIONAL CURB INLETS

CSDI-1 & CSDI-1A | PAGE 1





PRECAST CONC. SLAB INLET COVERS

INLET COVER NOSE DETAIL

NOTES: 4" x 4" ANGLE MAY BE SUBSTITUTED FOR 4"x 1-5/8" CHANNEL.

ALL REINFORCING RODS WILL BE OF 1/2" DIA.

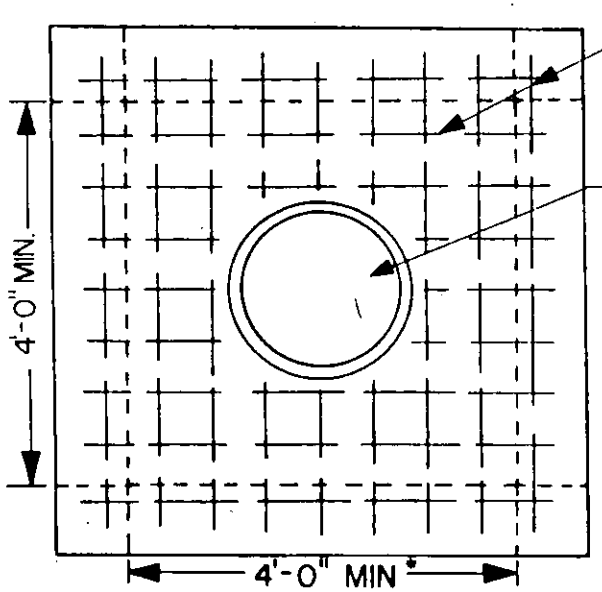
REVISIONS:

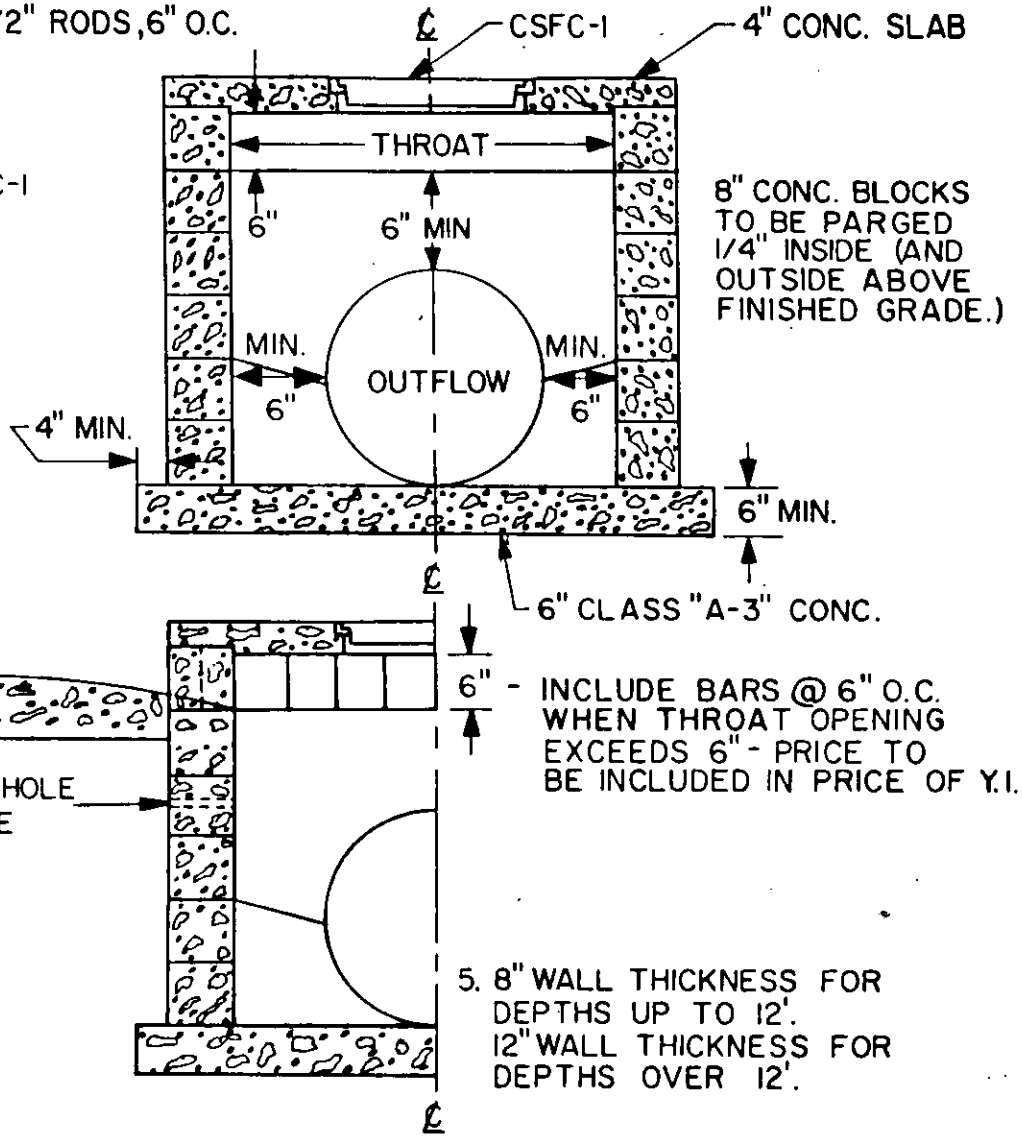
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

CURB DROP INLET TOP SLAB

& ADDITIONAL CURB INLETS TOP SLAB

CSDI-1 & CSDI-1A





* ON DEAD-END LINES AND STRUCTURES LESS THAN 5' DEEP THIS MIN CAN BE REDUCED TO 3'.

** NUMBER OF APRON CAN VARY FROM 1 TO 4 AS SPECIFIED ON PLANS AND/ OR BY THE ENGINEER IN FIELD.

NOTES: 1. WHEN SPECIFIED CONCRETE APRONS TO BE INCLUDED IN PRICE OF YARD INLET.

2. AN 8" THICK CONC. APRON 2' WIDE (MIN.) WILL BE INSTALLED IN FRONT OF EACH THROAT. THEY WILL BE SHAPED TO MEET CONDITIONS AS DIRECTED IN THE FIELD.

3. CLASS "A3" CONC. USED THROUGHOUT

4. WALLS OF POURED OR BLOCK CONC., OR BRICK IN MORTAR WILL BE PARGED 1/4" INSIDE (AND OUTSIDE ABOVE FINISHED GRADE.)

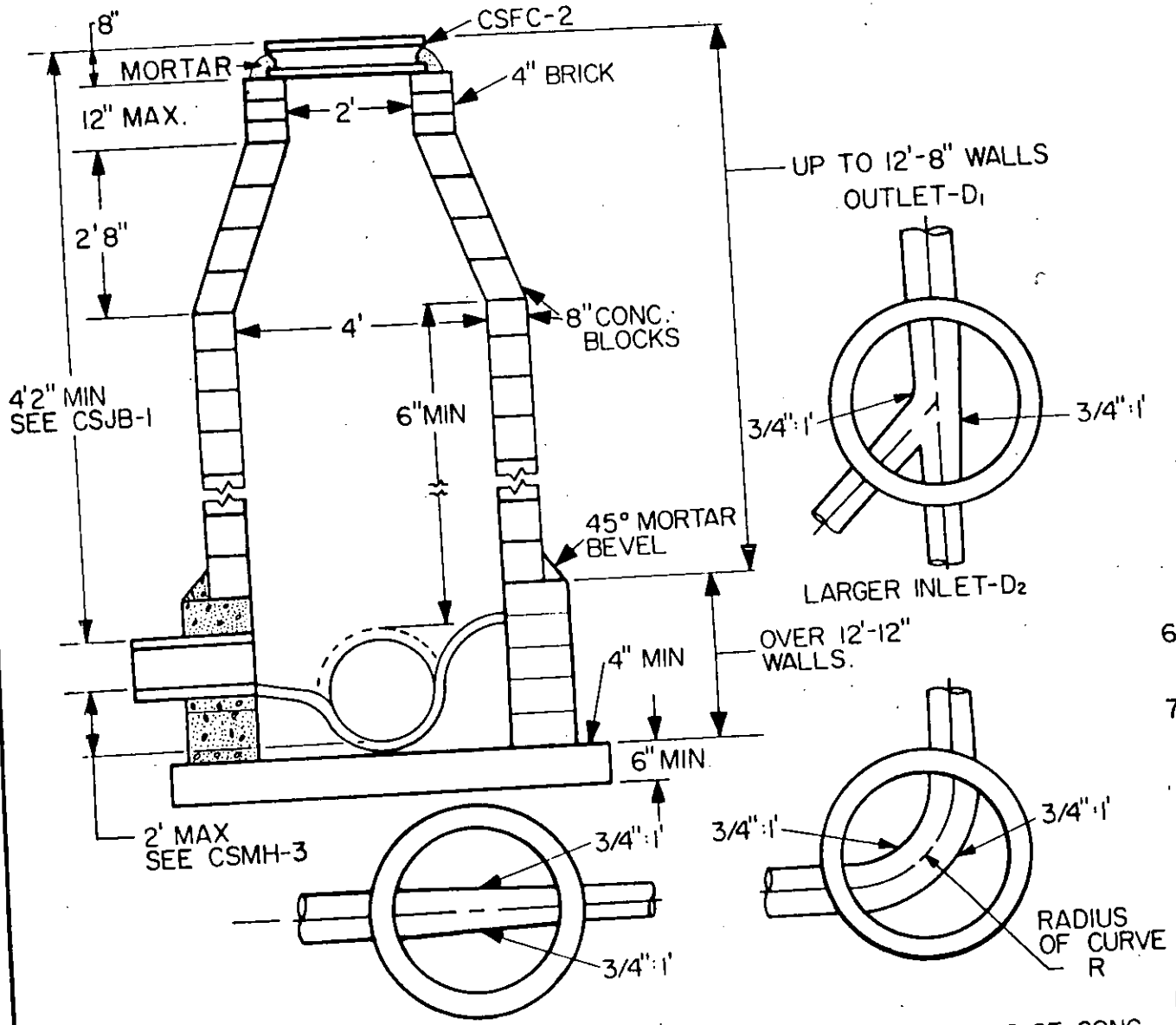
REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT

ALEXANDRIA VIRGINIA

YARD INLET
(PIPE SIZE TO 60")

CSYI-1



NOTES: 1. CONSTR. OF CLASS "A3" CONC., CONC. BLOCK, OR BRICK IN MORTAR; PARGED INSIDE 1/4" MIN. (AND OUTSIDE ABOVE FINISHED GRADE)

2. TO DEPTH OF 12' WALLS WILL BE 8" THICK,, BELOW 12' WALLS WILL BE 12" THICK.

3. CHANNEL BEND TO BE GREATEST

4. CHANNEL MAY BE FORMED OF CONC. AND FINISHED SMOOTH, FORMED OF HALF PIPE AND FITTINGS, OR FORMED OF BRICKWORK.

5. INVERT TO SLOPE 3/4":1' TOWARD CHANNEL.

6. MAIN CHANNEL INVERT WILL PITCH DOWN UNIFORMLY FROM THE INLET ACCORDING TO CONDITIONS.

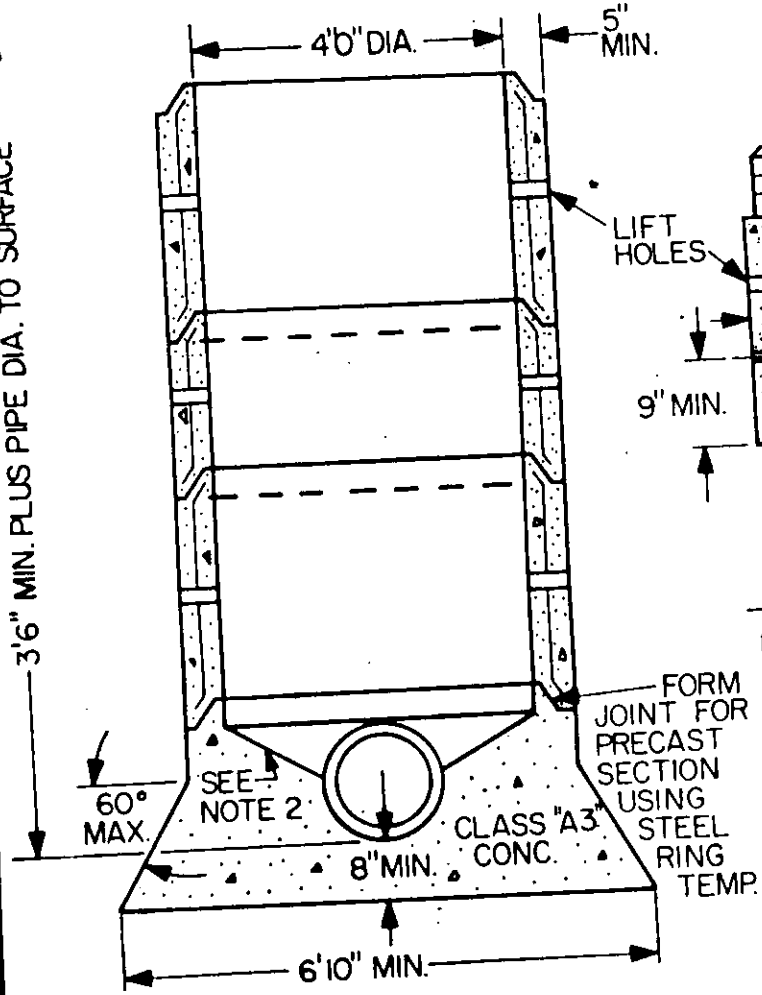
7. STEPS, WHEN USED, MUST BE NON CORROSIVE, YIELD RATHER THAN BREAK, AND MEET A.S.T.M. AND OSHA REQUIREMENTS. THEY CAN BE STAINLESS STEEL OR REINFORCED PLASTIC STEPS AND MUST BE APPROVED BY THE ENGINEER. PRICE TO BE INCLUDED IN THE PRICE OF THE MANHOLE COMPLETE IN PLACE.

REVISIONS:

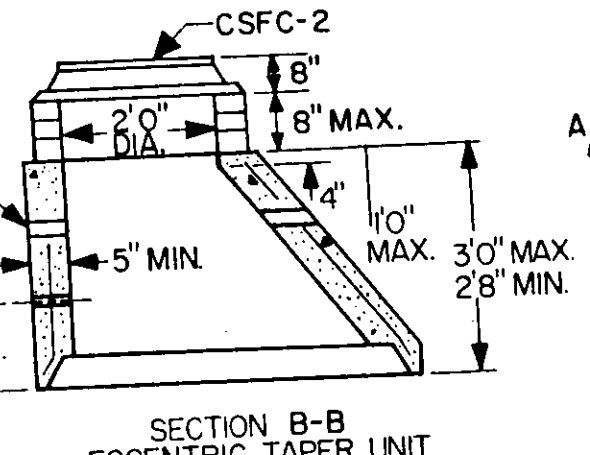
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

TYPE-1 MANHOLE
(PIPE SIZE TO 36")

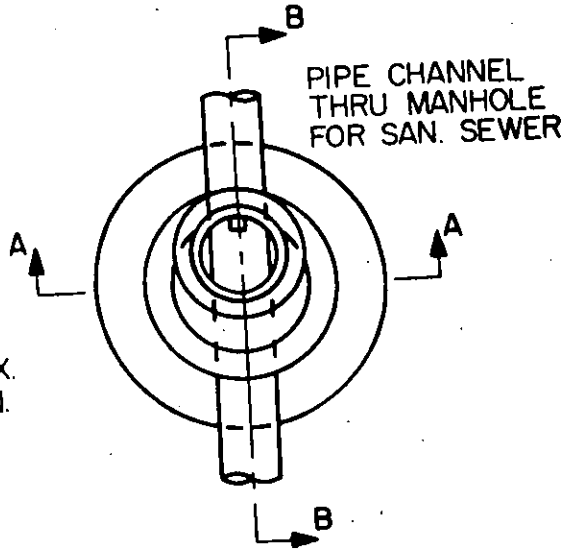
CSMH-1 | PAGE 4



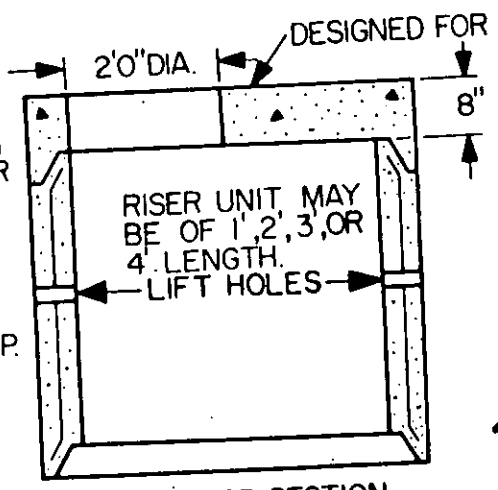
SECTION A-A
BASE AND RISER UNITS



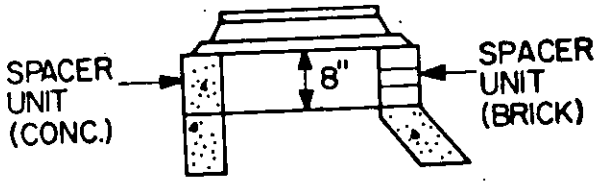
SECTION B-B
ECCENTRIC TAPER UNIT



TOP VIEW



FLAT TOP SECTION
(ALT.)



OPTIONAL SPACER UNITS

NOTES:
1. RISERS, AND TAPER UNITS TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF AASHO DESIGNATION M199, EXCEPT WALL THICKNESS IS 5" MIN. BASE TO BE POURED IN PLACE ON SAME DAY PIPE IS LAID THRU MH.
2. SLOPE FLOOR FROM SPRING LINE OF SAN. SEWER, FROM FLOW LINE OF STRM. SEWER.
3. TWO 2" DIA. LIFT HOLES TO BE PROVIDED IN EACH RISER & TAPER UNIT ABOVE THE CENTER OF GRAVITY WITH CENTERS 180° APART. TWO LIFTING HOOKS OF FABRICATOR'S DESIGN TO BE PROVIDED IN BASE.
4. TONGUE & GROOVE JOINT TO BE OF FABRICATOR'S DESIGN, WITH 'O'-RING JOINTS. SEE CSMH-2A FOR DETAILS.

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

TYPE-2 MANHOLE
PRECAST

CSMH-2

NOTES CON'T:

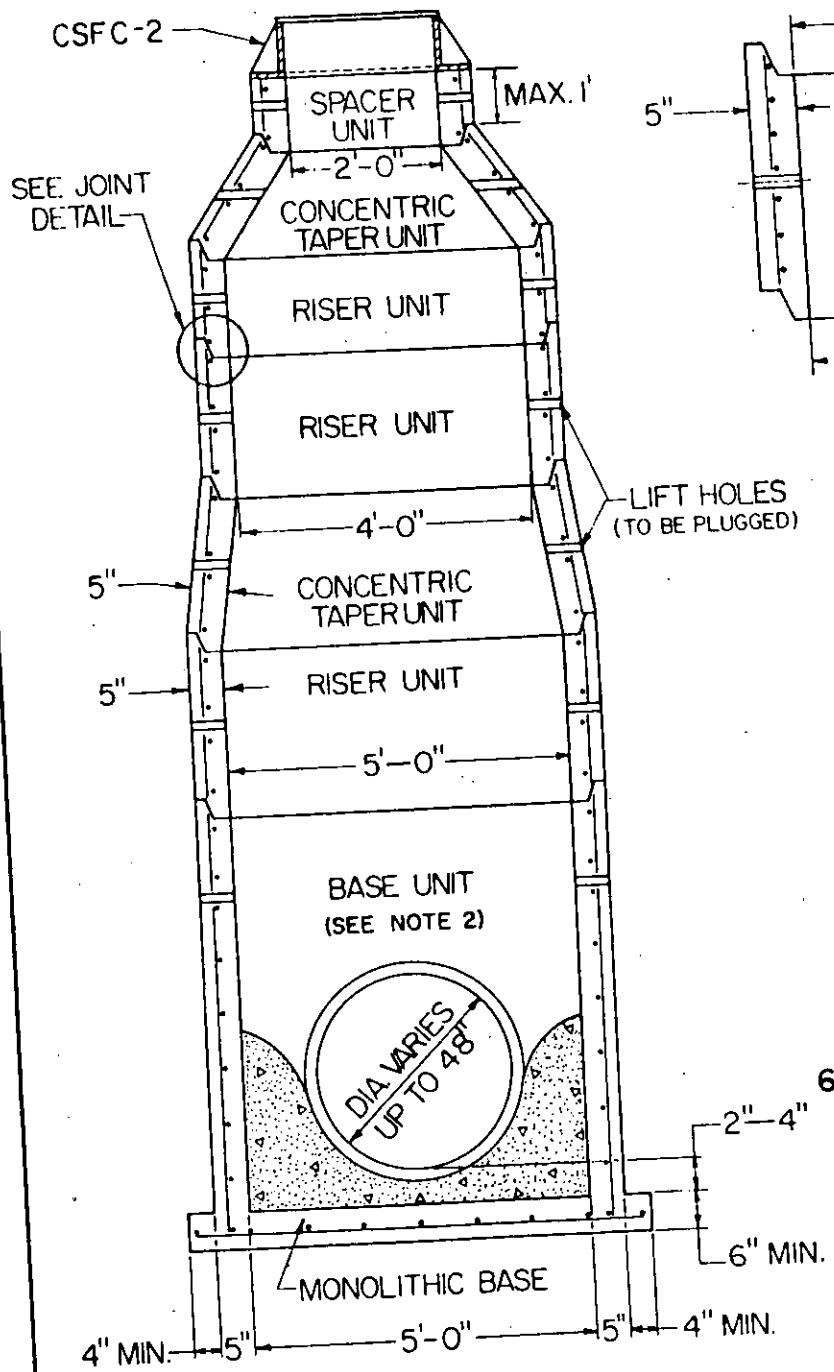
5. A MINIMUM OF 1'6" ALONG THE OUTER CIRCUMFERENCE IS TO REMAIN BETWEEN THE EXTREMITIES OF HOLES FOR ADJACENT PIPES IN ANY SINGLE UNIT.
6. ALL PIPES ARE TO BE MORTARED INTO HOLES PROVIDED.
7. BASE UNIT MUST BE 4'0" IN HEIGHT FOR USE WITH 30" OR 36" PIPE.
8. BASIS OF PAYMENT TO BE PER MANHOLE COMPLETE IN PLACE, INCLUDING ALL NECESSARY ITEMS, FRAME AND COVER, ETC.
9. CONCENTRIC CONE TOP IS ALLOWED.
10. STEPS, WHEN USED, MUST BE NON-CORROSIVE, YIELD RATHER THAN BREAK, AND MEET A.S.T.M. AND OSHA REQUIREMENTS. THEY CAN BE STAINLESS STEEL OR REINFORCED PLASTIC STEPS AND MUST BE APPROVED BY THE ENGINEER. PRICE TO BE INCLUDED IN THE PRICE OF THE MANHOLE COMPLETE IN PLACE.

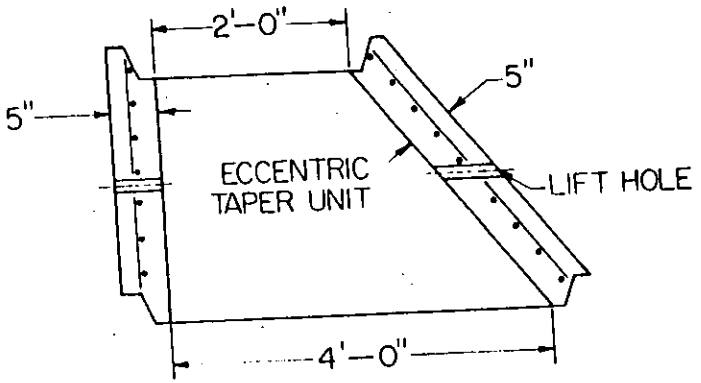
REVISIONS:

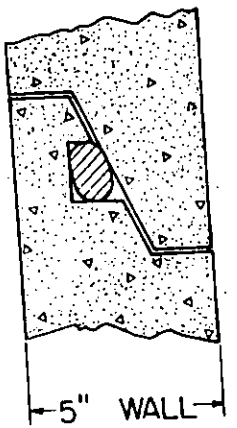
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

TYPE-2 MANHOLE
PRECAST

CSMH-2 | PAGE 5-1







O-RING JOINT DETAIL

NOTES:

1. CONCRETE STRENGTH 4,000 PSI MIN. AT 28 DAYS.
2. BASE UNIT MUST BE 4'-0" IN HEIGHT FOR 15" TO 36" PIPE & 5'-0" FOR 42" TO 54" PIPE.
3. REINFORCEMENT OF THE BASE SLAB SHALL CONSIST OF NO. 4 (1/2" ϕ) STEEL BARS ON 8" O.C., BOTH DIRECTIONS.
4. REINFORCEMENT FOR STANDARD UNIT SHALL HAVE NOT LESS THAN 0.12 SQUARE INCHES PER LINEAR FOOT.
5. JOINTS BETWEEN UNITS SHALL BE TONGUE & GROOVE.
6. STEPS, WHEN USED, MUST BE NON-CORROSIVE, YIELD RATHER THAN BREAK, AND MEET A.S.T.M. AND OSHA REQUIREMENTS. THEY CAN BE STAINLESS STEEL OR REINFORCED PLASTIC STEPS AND MUST BE APPROVED BY THE ENGINEER. PRICE TO BE INCLUDED IN THE PRICE OF THE MANHOLE COMPLETE IN PLACE.

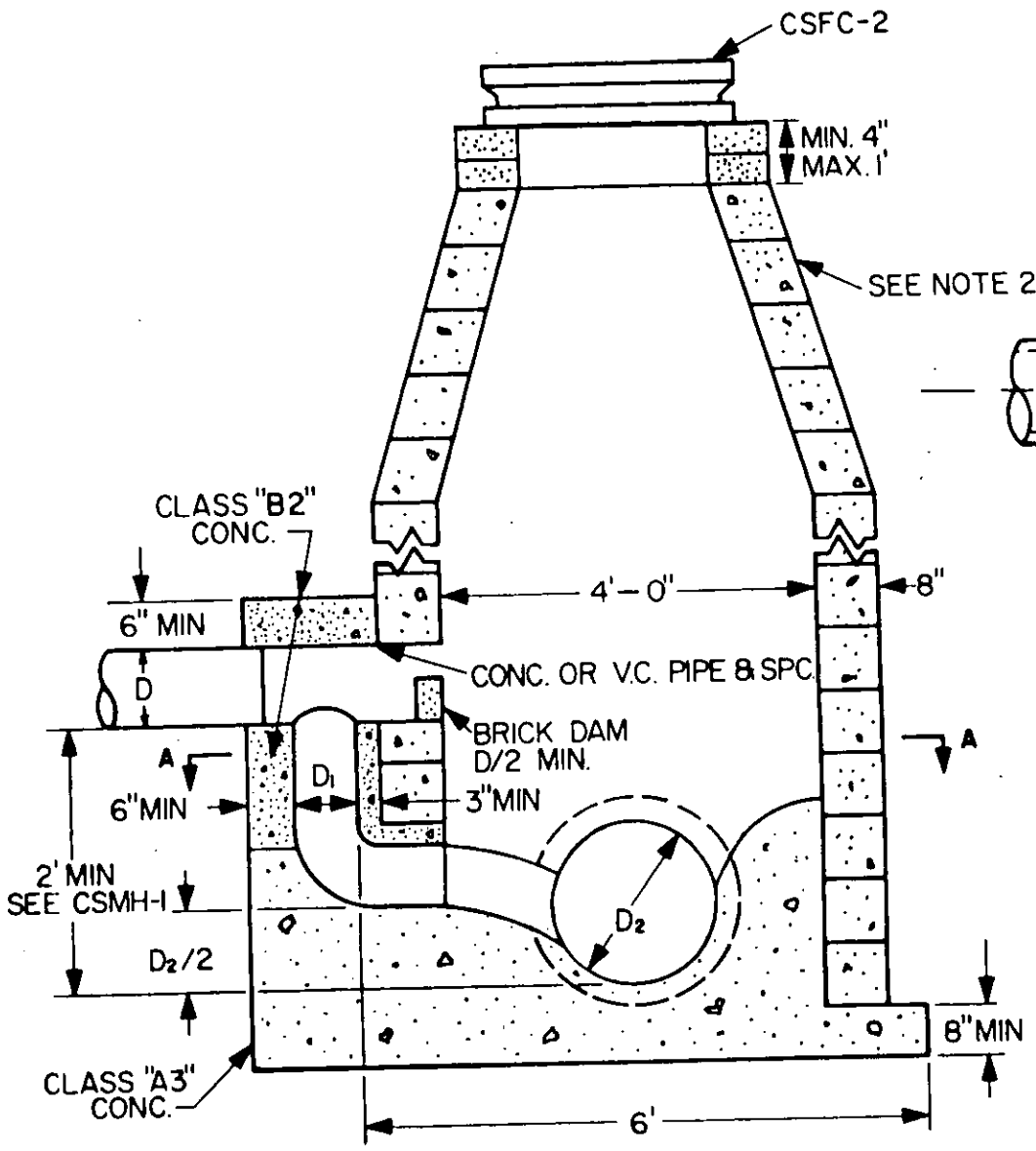
REVISIONS:

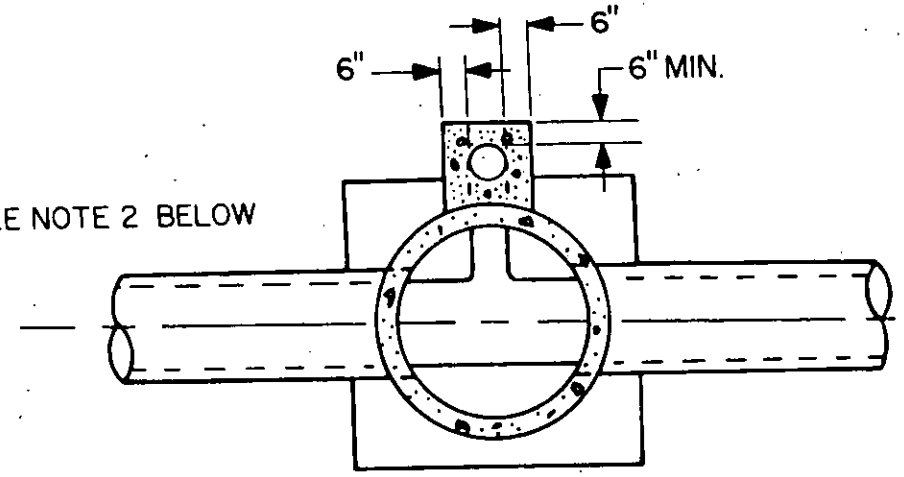
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

CITY STD. PRECAST MH.

MONOLITHIC BASE

CSMH-2A





SECTION A-A

DROP PIPE SIZE REQUIREMENTS			
INLET DIA. - "D"	10"	12"	OVER 12"
DROP PIPE DIA. - "D1"	8"	10"	12"

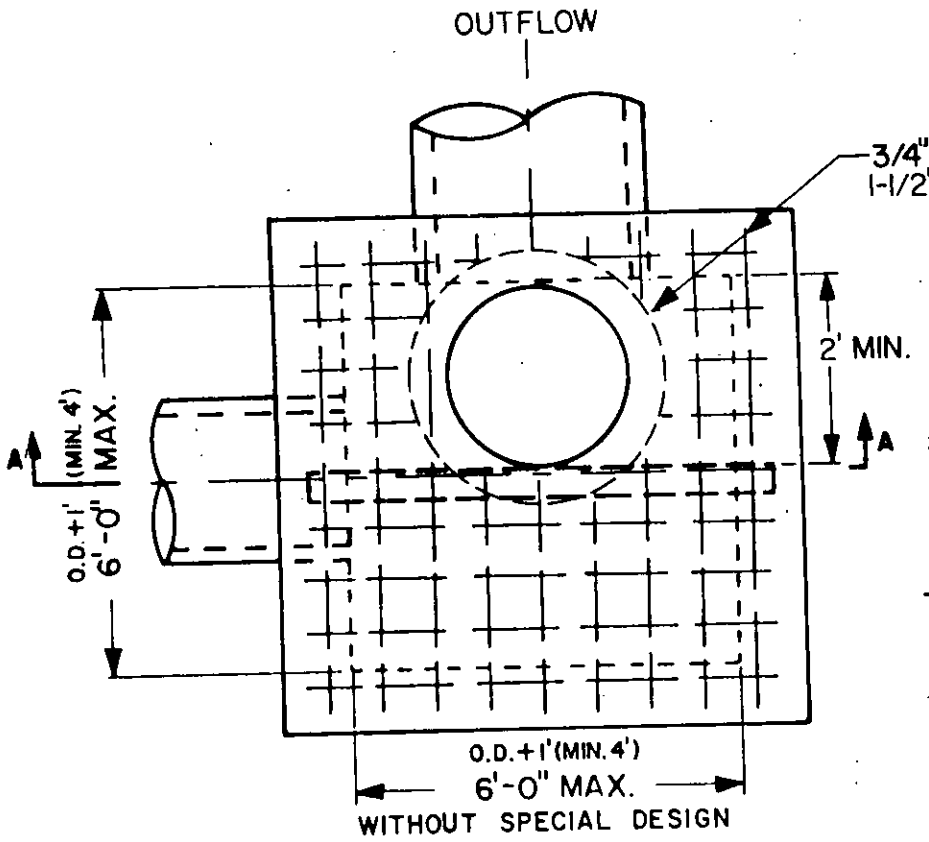
NOTES:
1. OUTSIDE DROP NOT REQUIRED FOR INFLOW INVERT LESS THAN 2' ABOVE OUTFLOW INVERT.
2. MANHOLE MAY BE PRECAST OR BLOCK. SEE DETAILS OF CSMH-1 AND CSMH-2.
3. STEPS, WHEN USED, MUST BE NON-CORROSIVE, YIELD RATHER THAN BREAK, AND MEET A.S.T.M. AND OSHA REQUIREMENTS. THEY CAN BE STAINLESS STEEL OR REINFORCED PLASTIC STEPS AND MUST BE APPROVED BY THE ENGINEER. PRICE TO BE INCLUDED IN THE PRICE OF THE MANHOLE COMPLETE IN PLACE.

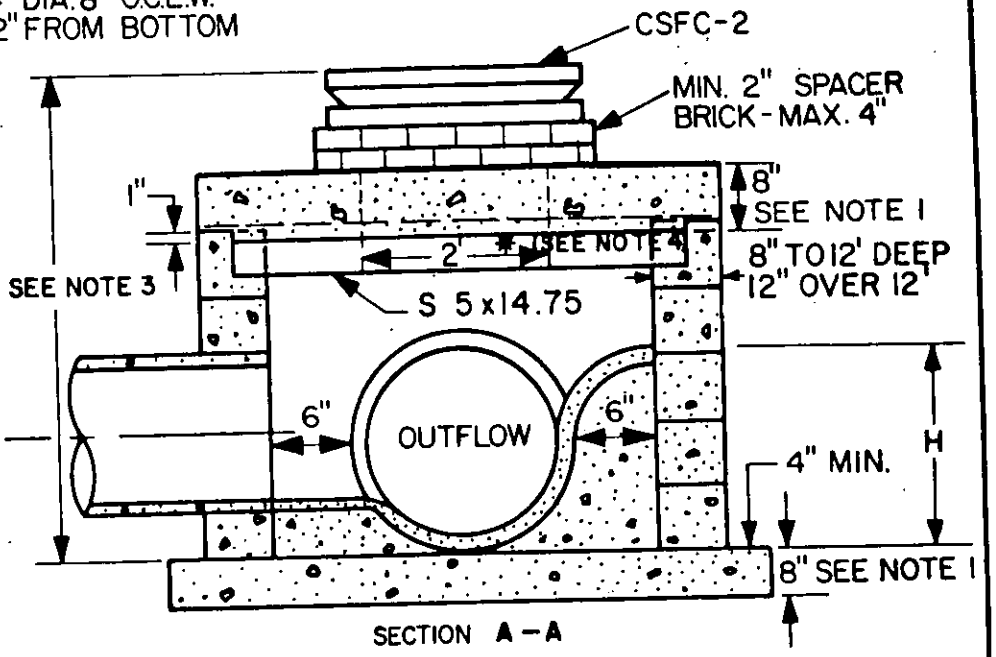
REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

TYPE-3 MANHOLE
(DROP)

CSMH-3 | PAGE 7





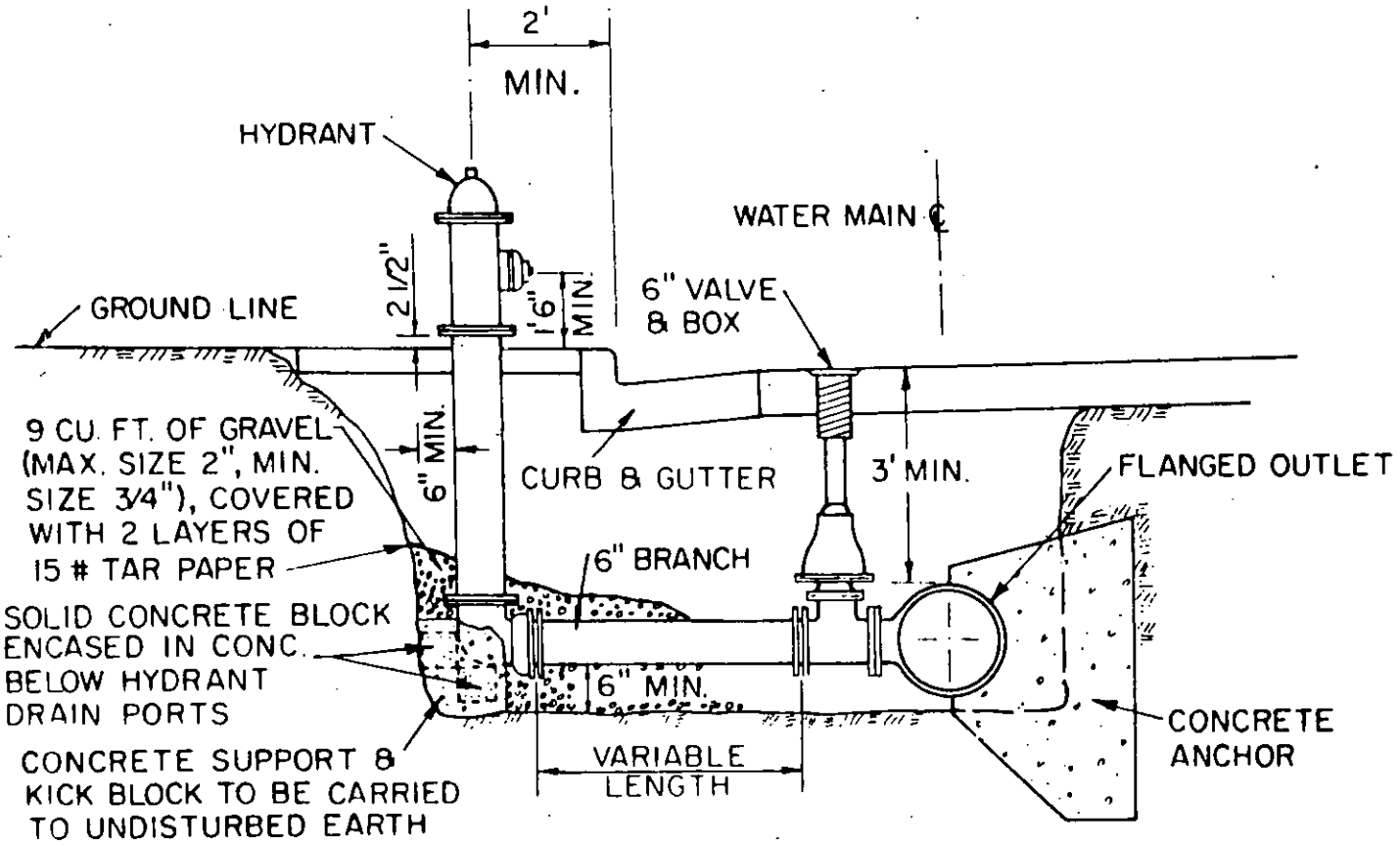
NOTES:
1. TOP AND BOTTOM SLAB MAY BE 6" MIN. WHEN NOT CONSTRUCTED IN STREET.
2. CONSTR. OF CLASS "A3" CONC., CONC. BLOCK, OR BRICK IN MORTAR, PARGED INSIDE (AND OUT ABOVE FINISHED GRADE) 1/4" MIN.
3. CSJB-1 TO BE USED WHEN THE DISTANCE FROM THE TOP OF CASTING IS LESS THAN 3'-8" OR WHEN THE SIZE OF PIPE REQUIRES ITS USE.
4. * WITHOUT USE OF 4' DIAMETER PRECAST CHIMNEY ON TOP OF 8" TOP SLAB, OTHER WISE USE 4' OPENING INSTEAD OF 2' AS SHOWN.
5. HEIGHT OF BENCH H TO BE AS SPECIFIED IN FIELD.
6. MANHOLE COVER AND FRAME ARE TO BE LOCATED ABOVE THE CENTERLINE OF THE OUTFLOW PIPE.
7. THE TOPS OF SMALLER INFLOW WILL BE AT LEAST AS HIGH AS THE TOP OF THE LARGEST INFLOW.
8. STEPS, WHEN USED, MUST BE NON-CORROSIVE, YIELD RATHER THAN BREAK, AND MEET A.S.T.M. AND OSHA REQUIREMENTS. THEY CAN BE STAINLESS STEEL OR REINFORCED PLASTIC STEPS AND MUST BE APPROVED. PRICE TO BE INCLUDED IN THE PRICE OF MH COMPLETE IN PLACE.

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

JUNCTION BOX

CSJB-1 | PAGE 8



NOTES

1. FIRE HYDRANT: MUELLER CENTURION - CATALOG #A423 WITH 1-1/2 INCH PENTAGON OPERATING NUT, LEFT TURN TO OPEN.
   TWO 2 1/2 INCH HOSE NOZZLES
   ONE 4 INCH HOSE NOZZLE
2. VALVE: MUELLER GATE VALVE - CATALOG #A2380-20, WITH 6 INCH MECHANICAL JOINTS.
   2 INCH SQUARE NUT, LEFT TURN TO OPEN.
3. LOCATION IS TO BE AS SHOWN ON PLANS. VARIANCE OF THE 2' MIN. FROM FACE OF CURB SHALL BE REVIEWED ON AN INDIVIDUAL BASIS BY THE CITY ENGINEER.

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT

ALEXANDRIA VIRGINIA

FIRE HYDRANT INSTALLATION

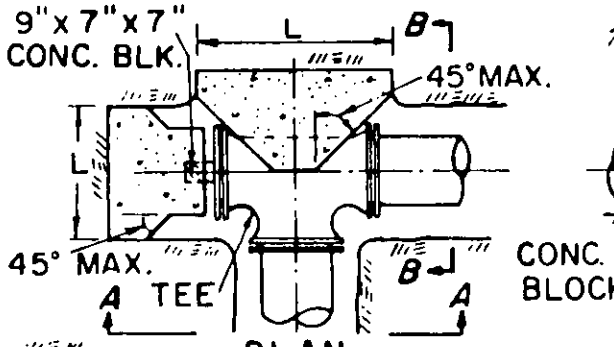
CSFH-1 | PAGE 9

PIPE SIZE INCHES	DEGREE OF BEND	MINIMUM CONCRETE ANCHOR BLOCK DIMENSIONS – FEET WORKING PRESSURE										VOLUME OF CONCRETE CU. YD. (1)
		75 PSI		100 PSI		125 PSI		150 PSI		175 PSI		
		L	H	L	H	L	H	L	H	L	H	
6	90	2.5	1.0	2.5	1.5	2.0	2.0	2.5	2.0	3.0	2.0	0.24
	45	1.5	1.0	2.0	1.0	2.0	1.0	2.5	1.0	2.0	1.5	0.13
	11¼, 22½	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.0	1.5	1.0	0.06
8	90	2.0	2.0	2.5	2.5	3.0	2.5	4.0	2.0	4.0	2.5	0.40
	45	2.5	1.0	2.0	1.5	2.0	2.0	2.5	2.0	2.5	2.0	0.19
	11¼, 22½	1.5	1.0	1.5	1.0	2.0	1.0	2.5	1.0	2.0	1.5	0.10
12	90	3.0	3.0	4.0	3.0	5.0	3.0	5.0	4.0	5.5	4.0	0.78
	45	2.5	2.0	3.5	2.0	4.0	2.5	4.0	2.5	4.0	3.0	0.45
	11¼, 22½	2.5	1.0	2.5	1.5	2.5	2.0	2.5	2.0	3.0	2.0	0.24
12	90	5.0	3.5	5.5	4.0	6.0	4.5	7.5	4.5	7.5	5.0	1.43
	45	4.0	2.5	4.0	3.0	5.0	3.0	5.0	3.5	5.0	4.5	0.78
	11¼ 22½	2.5	2.0	3.0	2.0	3.0	2.5	3.0	3.0	4.0	3.0	0.39
20	90	5.5	4.5	6.5	5.5	7.5	5.5	8.5	6.0	9.5	6.0	1.99
	45	4.0	3.5	5.0	4.0	5.5	4.0	6.0	4.5	7.0	4.5	1.11
	11¼, 22½	3.0	2.5	3.5	3.0	4.0	3.0	4.5	3.0	5.5	3.0	0.58
24	90	6.5	5.5	8.0	6.0	9.5	6.5	11.0	6.5	13.0	6.5	2.37
	45	5.0	4.0	5.5	5.0	7.5	4.5	7.0	5.5	9.0	5.0	1.36
	11¼, 22½	3.5	3.0	4.0	3.4	5.0	3.5	5.0	4.0	6.0	4.0	0.69

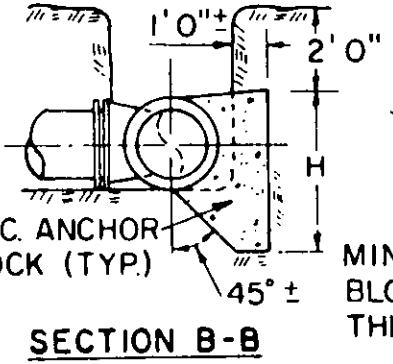
(1) APPROXIMATE VOLUME OF CONCRETE REQUIRED FOR VARIOUS SIZE BENDS AT 100 psi WORKING PRESSURE & MINIMUM BLOCK THICKNESSES OF 1'-9" FOR 6", 8", 12" & 16" PIPE, 1'-6" FOR 20" PIPE, & 1'-4" FOR 24" PIPE.

NOTES

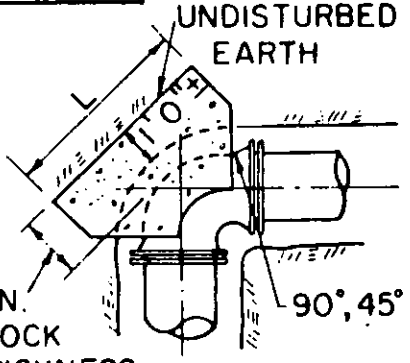
1. THE TABLE IS BASED ON 2000 psf SOIL BEARING CAPACITY, $R = 2PA \sin \theta/2$ & FOR A TEST PRESSURE = 1.5 x WORKING PRESSURE.
2. CONCRETE ANCHOR BLOCK DIMENSIONS FOR TEES TO BE SAME AS SHOWN FOR 90° BENDS.
3. ANCHOR BLOCK DESIGN FOR PIPE LARGER THAN 24" SHALL BE REVIEWED ON AN INDIVIDUAL BASIS BY THE CITY ENGINEER.



PLAN



SECTION B-B



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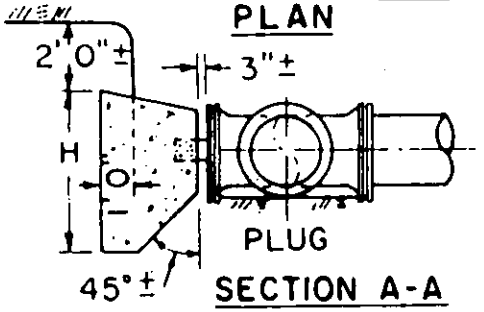


SECTION A-A

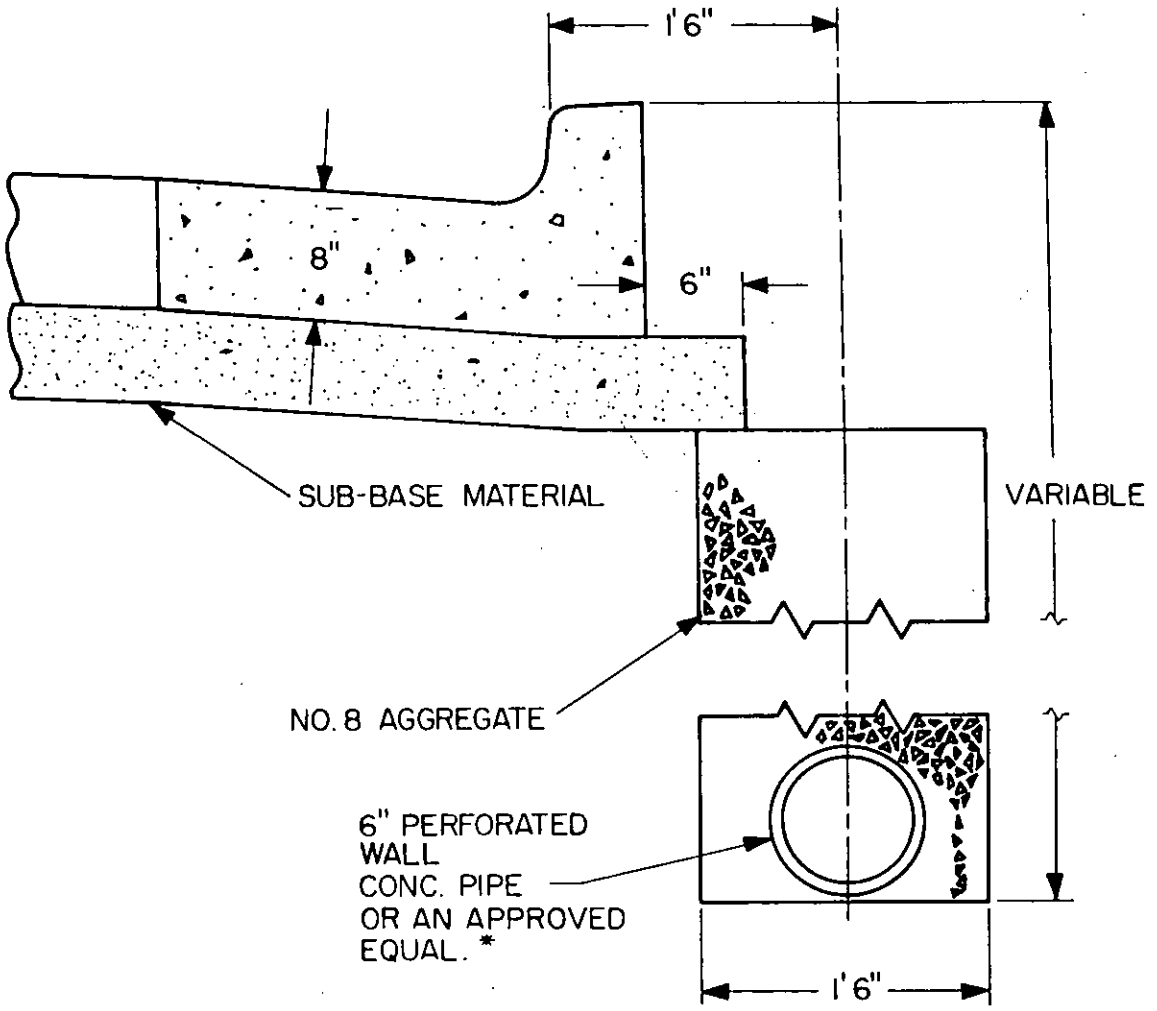
REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT

ALEXANDRIA VIRGINIA

CONCRETE ANCHOR BLOCK

CSCAB-1 | PAGE 9-1



NOTES: SUBBASE MATERIAL UNDER CURB NOT REQUIRED UNLESS SHOWN ON PLANS. WHERE SUBBASE IS NOT INCLUDED EXTEND NO. 8 AGGREGATE TO BOTTOM OF CONCRETE CURB.

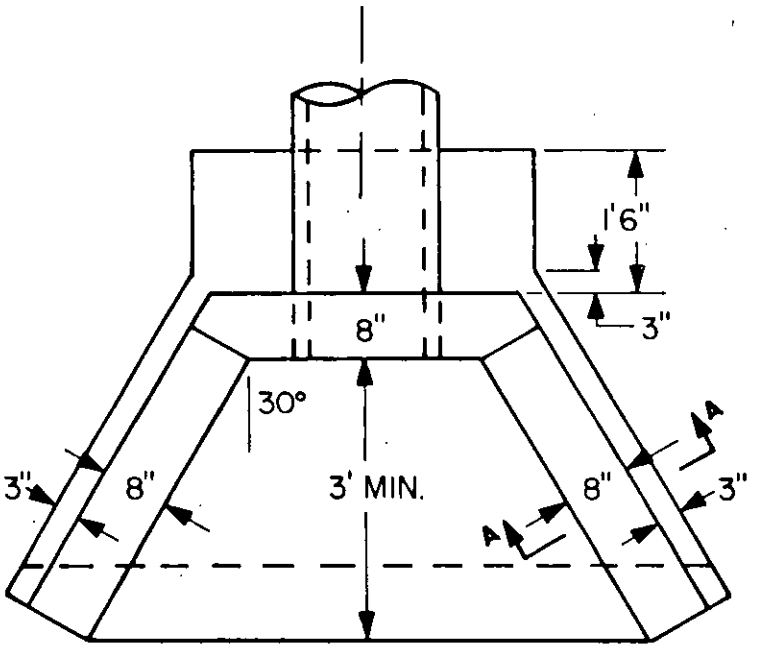
*LARGER SIZE OF PIPE MAY BE SPECIFIED WHEN FLOW WARRANTS

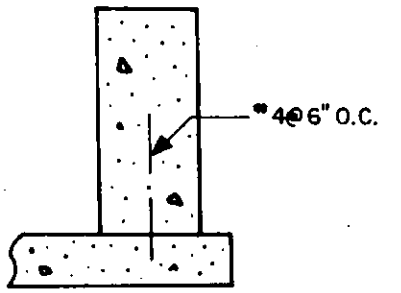
REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

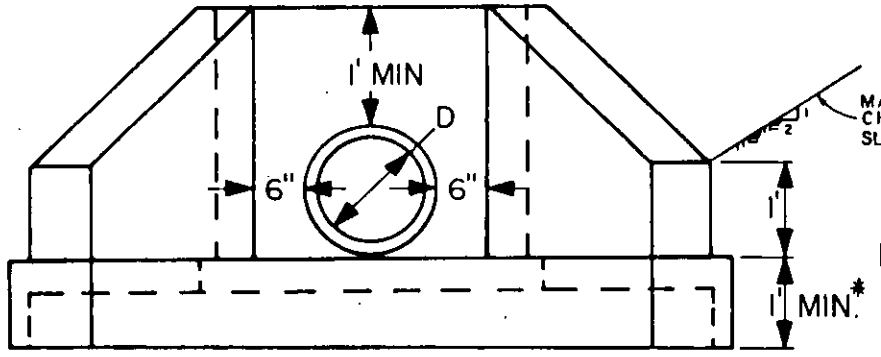
UNDERDRAIN

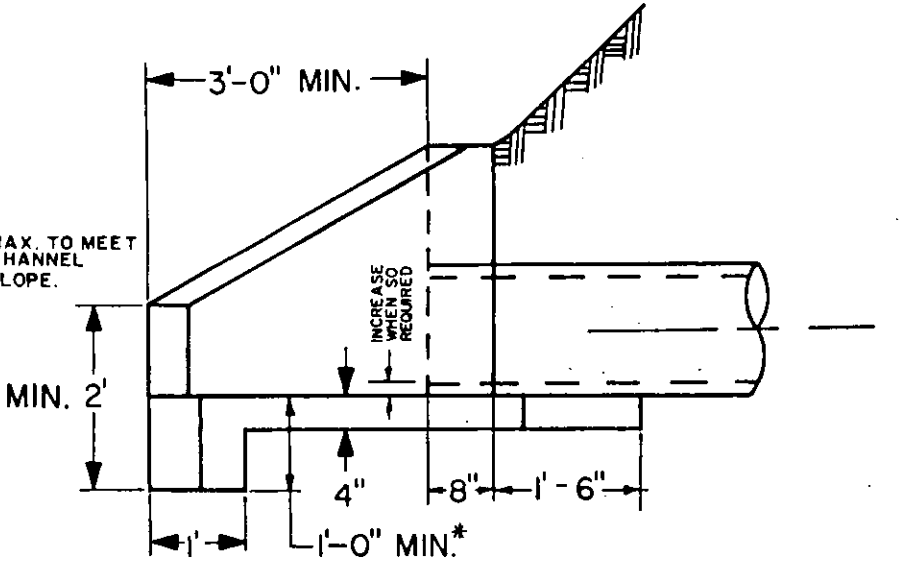
CSUD-1





SECTION A-A





NOTES: 1. CLASS "A 3" AIR-ENTRAINED CONC. USED THROUGHOUT.

2. NO. 4 REINFORCING RODS SPACED 6" O.C., TO BE PLACED BETWEEN FOOTING AND WINGWALL, PRICE TO BE INCLUDED IN PRICE OF ENDWALL.

3.* THE FIELD ENGINEER, MAY INCREASE THIS TO 3' WITHOUT EXTRA COMPENSATIONS, WHERE FIELD CONDITIONS WARRANT.

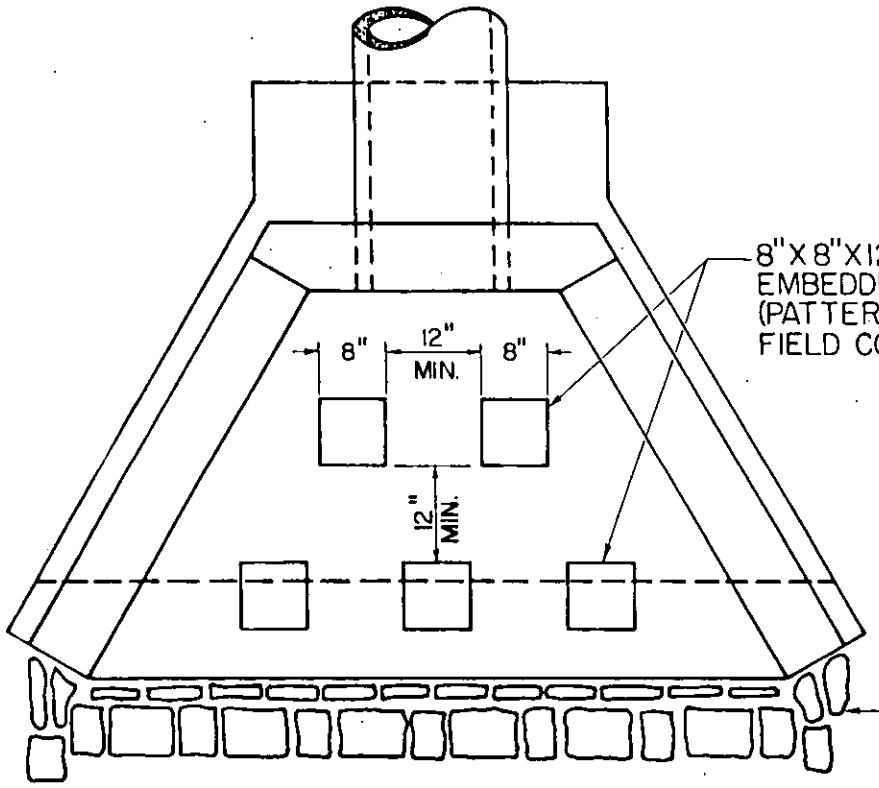
4. APRON MAY BE REQUIRED TO BE DROPPED MAX. 2'-0" BELOW INV. OF PIPE WITHOUT EXTRA COMPENSATION.

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

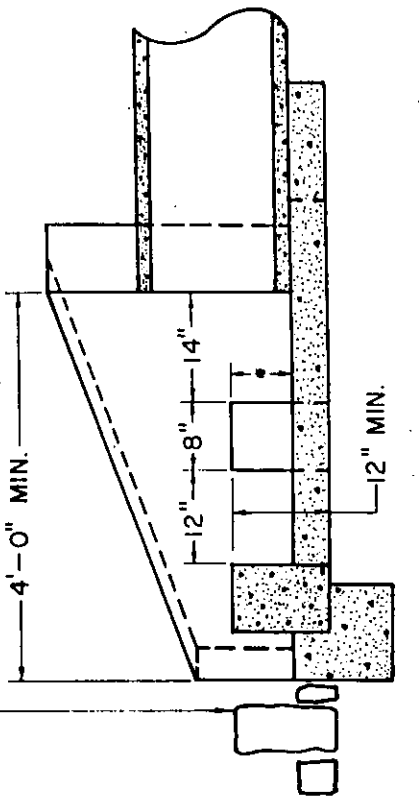
ENDWALL
(PIPE SIZE 15"-36")

CSEW-1 | PAGE 11

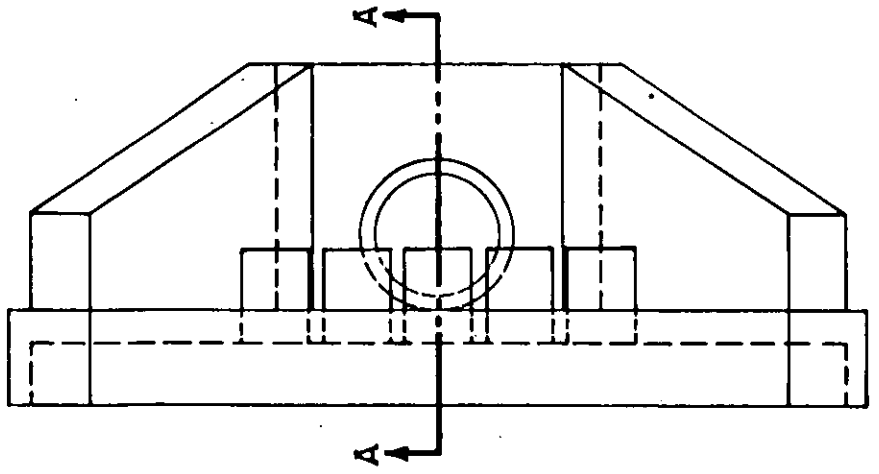


8"X8"X12"* CONC. BLOCKS EMBEDDED IN APRON. (PATTERN TO VARY AS FIELD CONDITIONS WARRANT.)

SEPARATE ITEM IF SPECIFIED



SECTION A—A



* DEPTH TO VARY AS FIELD CONDITION & SIZE OF PIPE WARRANT—MAX. 1/2 I. D. OF PIPE. IF MORE THAN 12" IN HEIGHT IS EXPOSED, BLOCKS MUST BE REINFORCED OR CUT STONE MAY BE USED.

NOTE:
FOR ENDWALL SPECS. & ADDITIONAL DETAILS SEE CSEW-1.

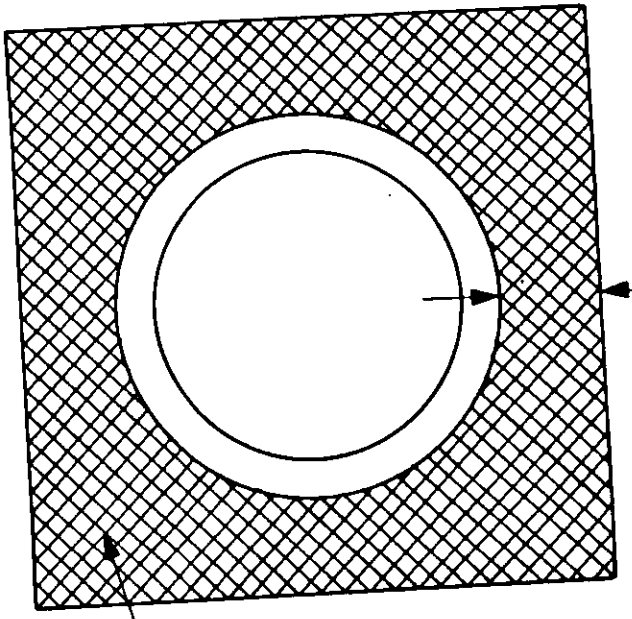
REVISIONS:

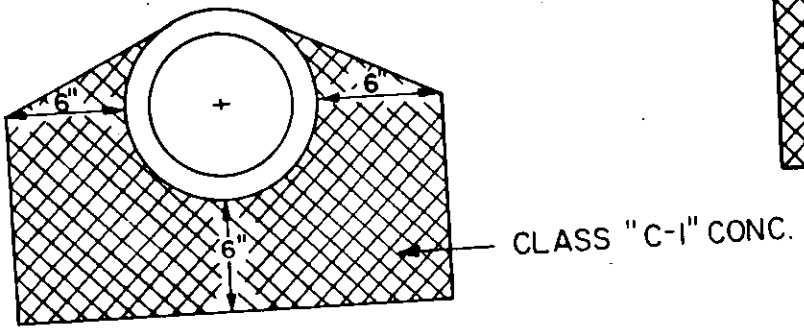
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

ENDWALL
(MODIFIED APRON)
PIPE SIZES 15"—36"

CSEW-2

PIPE ENCASEMENT





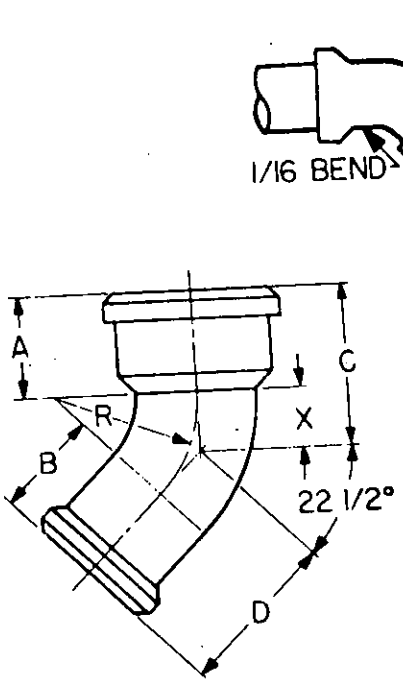
PIPE HIGH CRADLE

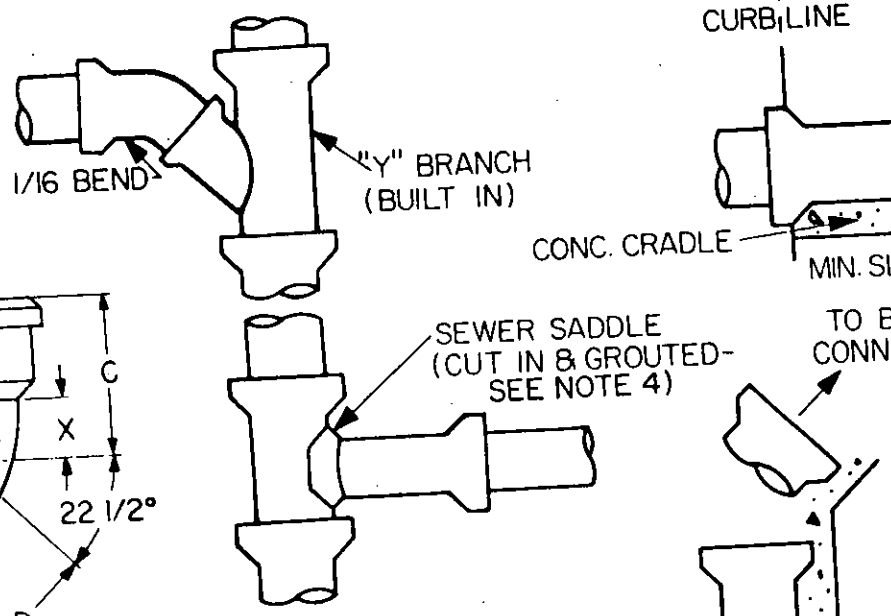
REVISIONS

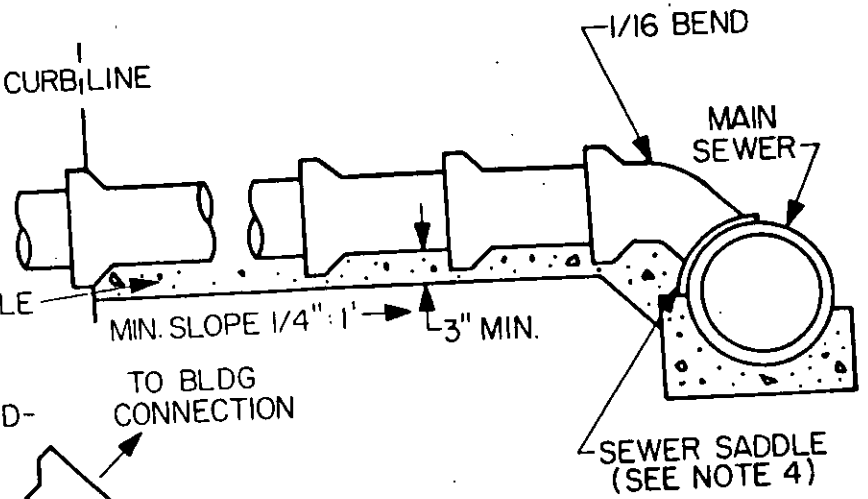
TRANPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

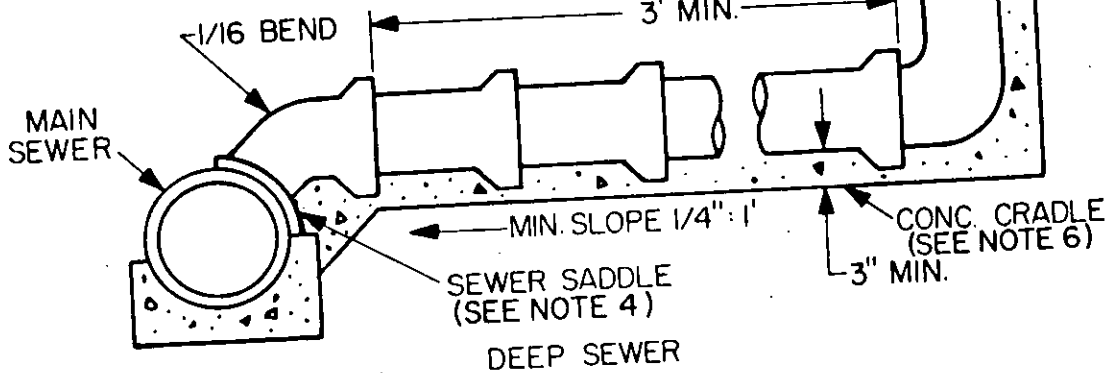
SEWER PIPE ENCASEMENT AND HIGH CRADLE

CSSE-1









DEEP SEWER

NOTES:

4. NO SADDLE TO BE USED ON PLASTIC MAIN. (T OR Y REQUIRED WHEN MAIN IS BUILT.)
5. PVC PIPE IN RIGHT OF WAY MUST BE MIN. SCHEDULE 40 OR SDR 35.
6. CONCRETE CRADLE TO BE USED IF COVER IS LESS THAN 5 FEET OR MORE THAN 12 FEET. CRADLE TO BE POURED TO SPRING LINE OF PIPE. IF COVER IS 2 FEET OR LESS PIPE IS TO BE ENCASED IN CONFORMENCE WITH CSSE-1.

NOTES:

1. CONSTR. TO CONFORM TO PLUMBING INSPECTORS REQUIREMENTS AND SPECIFICATIONS.
2. EXTRA STRENGTH CAST IRON PIPE OR OTHER PIPE TO BE USED PER PLUMBING INSPECTORS REQUIREMENTS.
3. ALL LATERAL FLOW WILL FALL TO MAIN SEWER AT 1/4" PER FOOT MIN.

PIPE SIZE	A	B	C	D	R	X
4"	3 1/2	4	4 5/16	4 13/16	4	1 5/16
5"	3 1/2	4	4 3/8	4 7/8	4 1/2	1 3/8
6"	3 1/2	4	4 1/2	5	5	1 1/2
8"	4 1/8	5 1/2	5 5/16	6 1/16	6	1 13/16

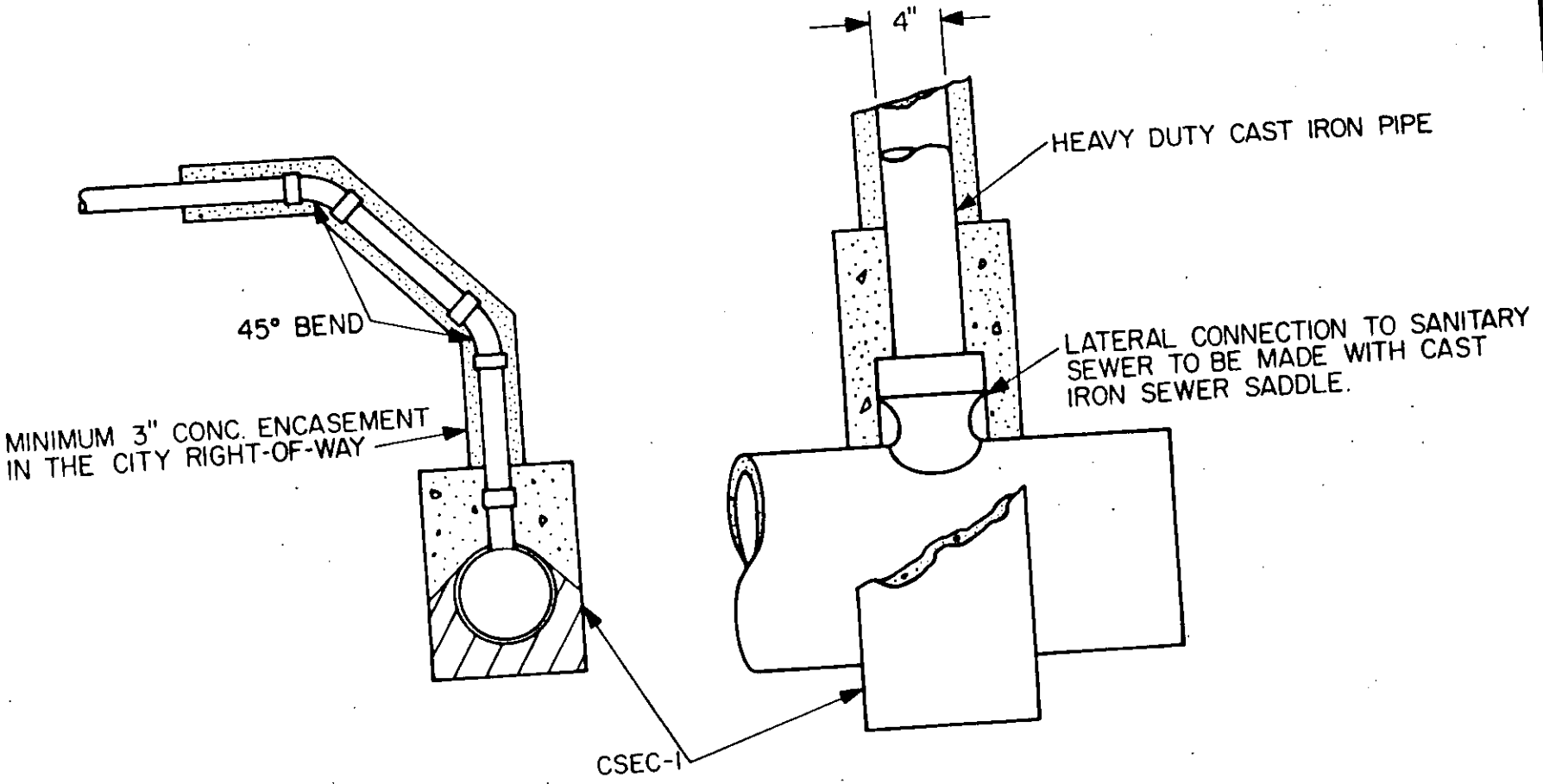
REVISIONS: 9-20-82

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT

ALEXANDRIA VIRGINIA

LATERAL CONNECTION

CSLC-1



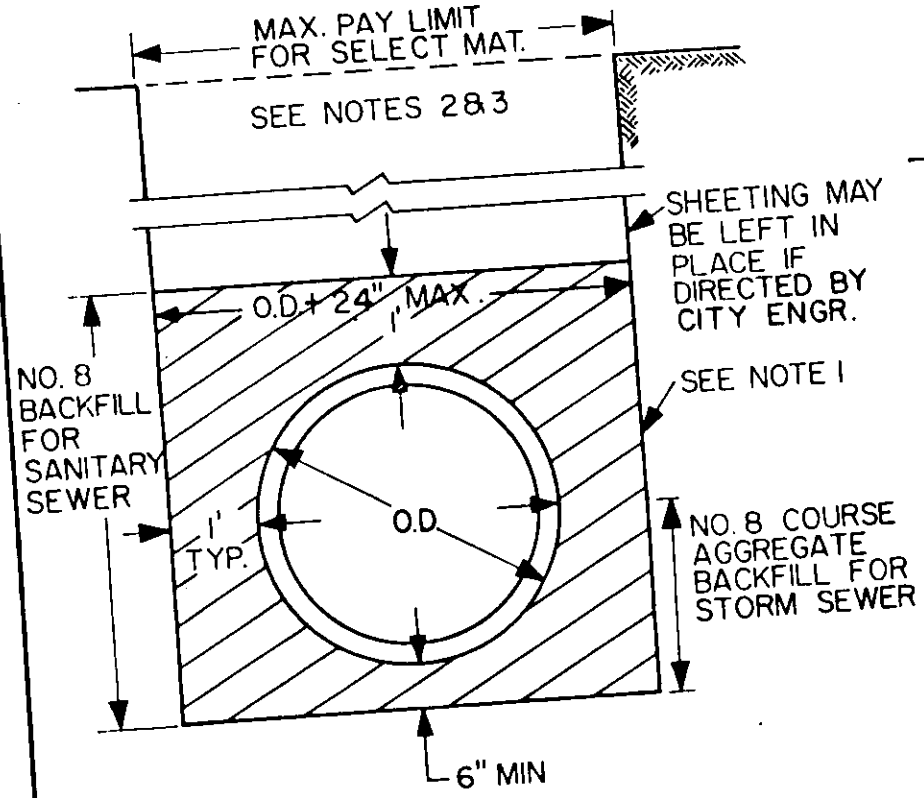
NOTES: 1. CONSTR. TO CONFORM TO PLUMBING INSPECTORS REQUIREMENTS AND SPECIFICATIONS.

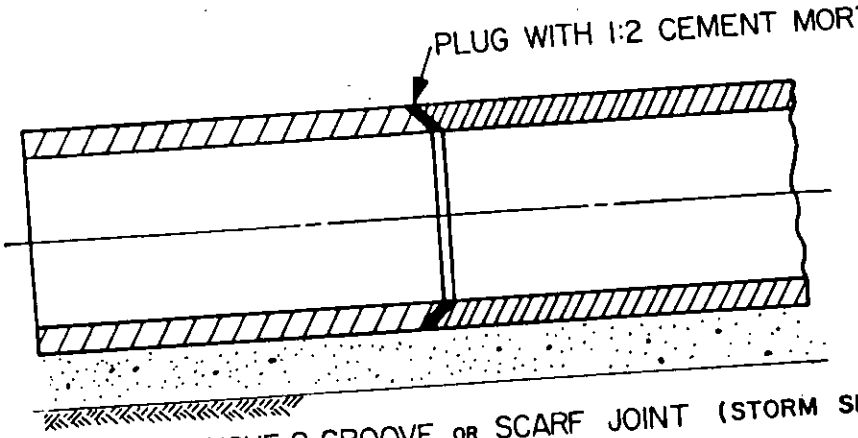
REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

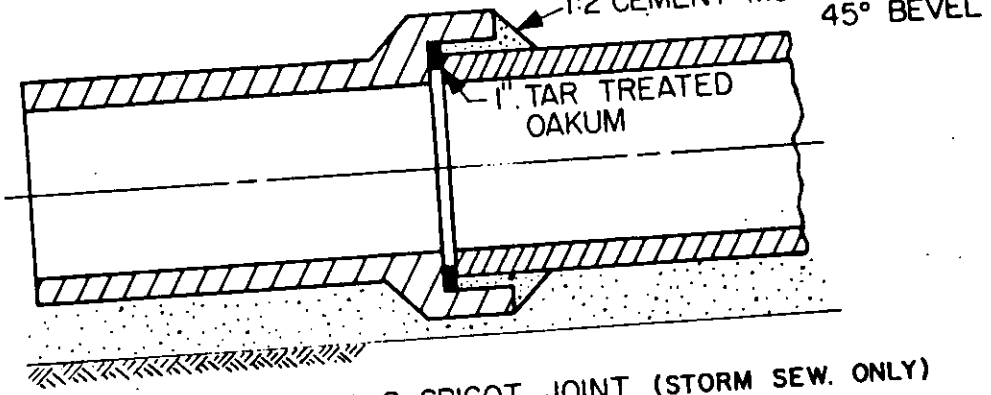
LATERAL CONNECTION
(SPECIAL DESIGN)

CSLC-2





TONGUE & GROOVE OR SCARF JOINT (STORM SEW. ONLY)
27" DIA. AND ABOVE



BELL & SPIGOT JOINT (STORM SEW. ONLY)
TO 24" DIA.

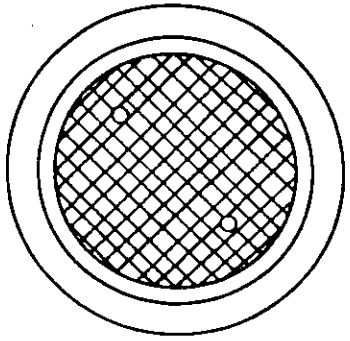
NOTES:
1. NO. 8 COARSE AGGREGATE BACKFILL TO 1' OVER SAN. SEW., OR TO CENTERLINE OF STORM SEW.
2. EXCAVATED MATERIAL BACKFILLED IN 6" LAYERS TO 95% COMPACTION. SELECT MATERIAL, WHERE CALLED FOR, MAY BE USED AS SEPARATE PAY ITEM.
3. BACKFILL IN RIGHT OF WAY TO BE SELECT GRANULAR MATERIAL - APPROVED BY CITY ENGR.
4. RUBBER GASKET TYPE JOINTS SHALL BE USED FOR ALL SANITARY SEWERS.

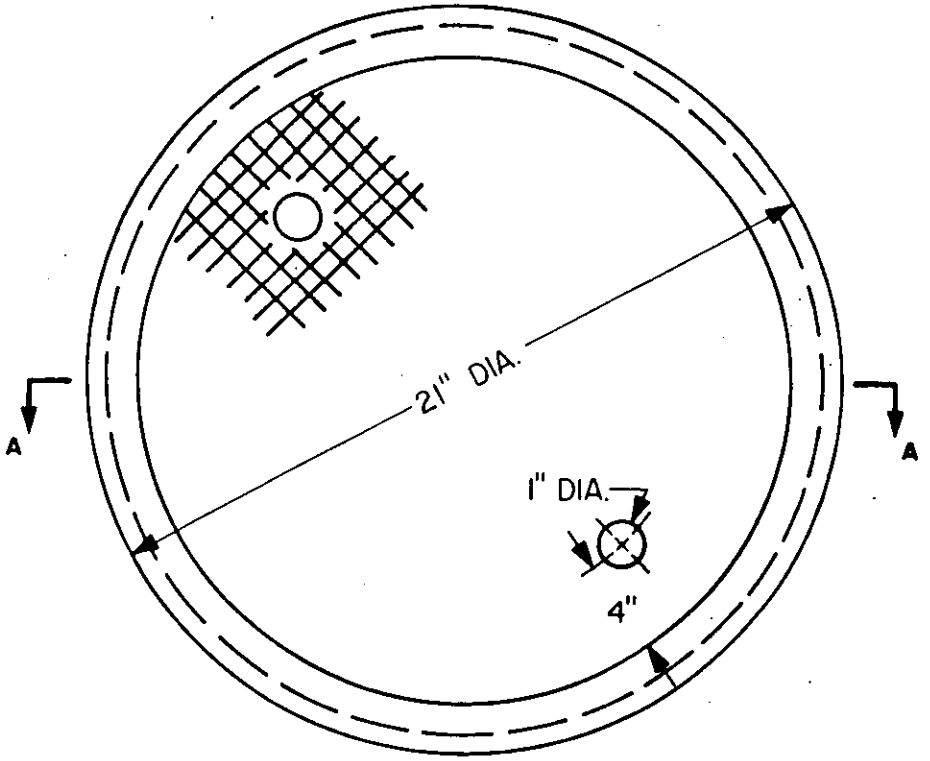
REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

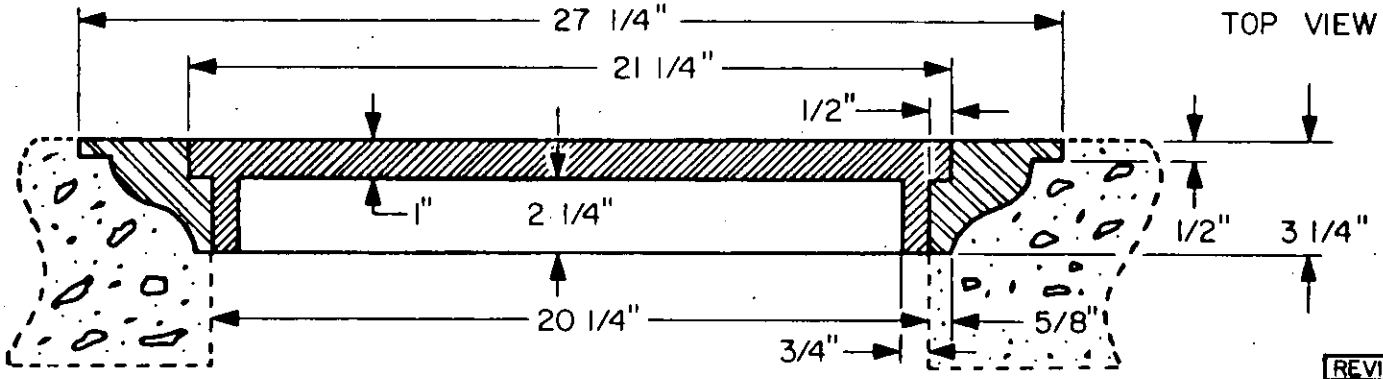
JOINTING & BEDDING FOR PIPE & TRENCH SECTIONS

CSJT-1





TOP VIEW



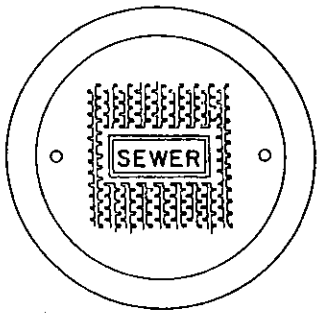
SECTION A-A

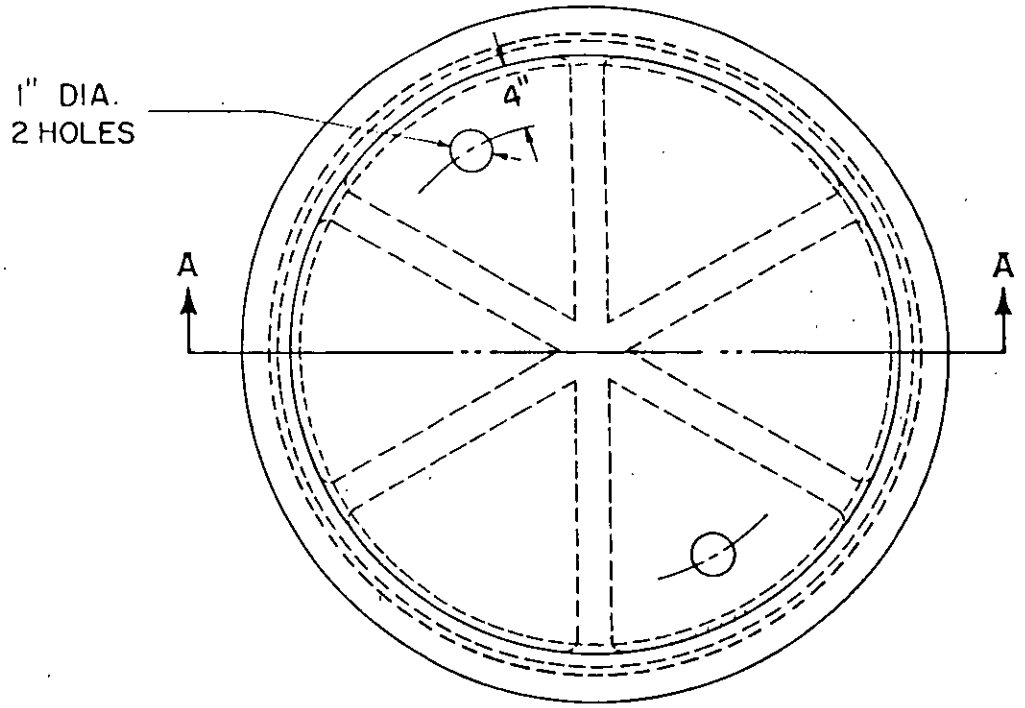
REVISIONS:

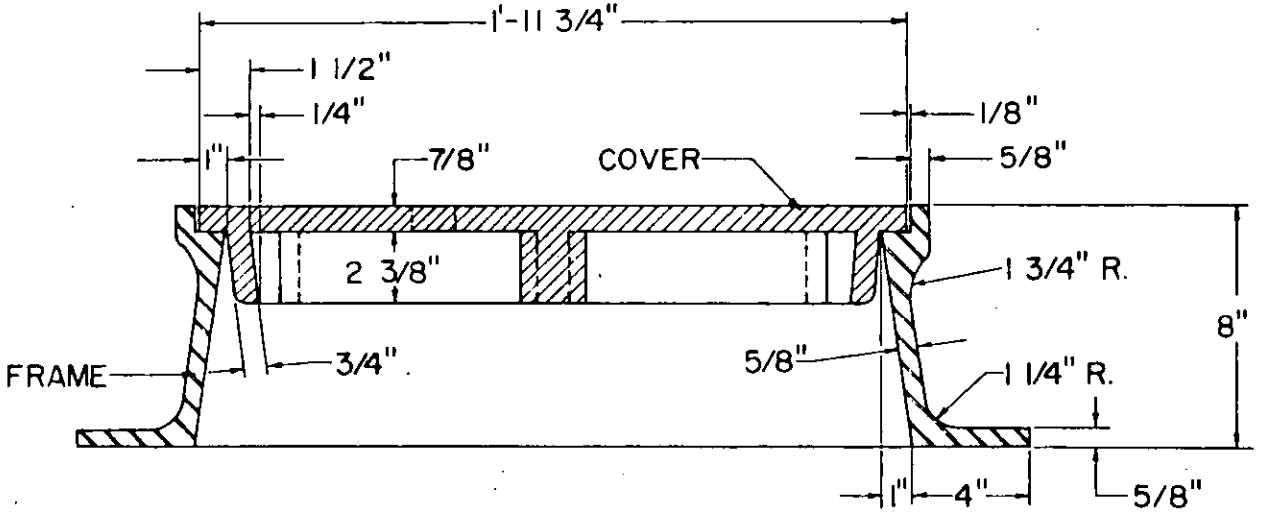
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

CURB DROP INLET FRAME & COVER

CSFC-1







SECTION "A—A"

NOTE:
TOP AND CASTING TO BE MACHINED

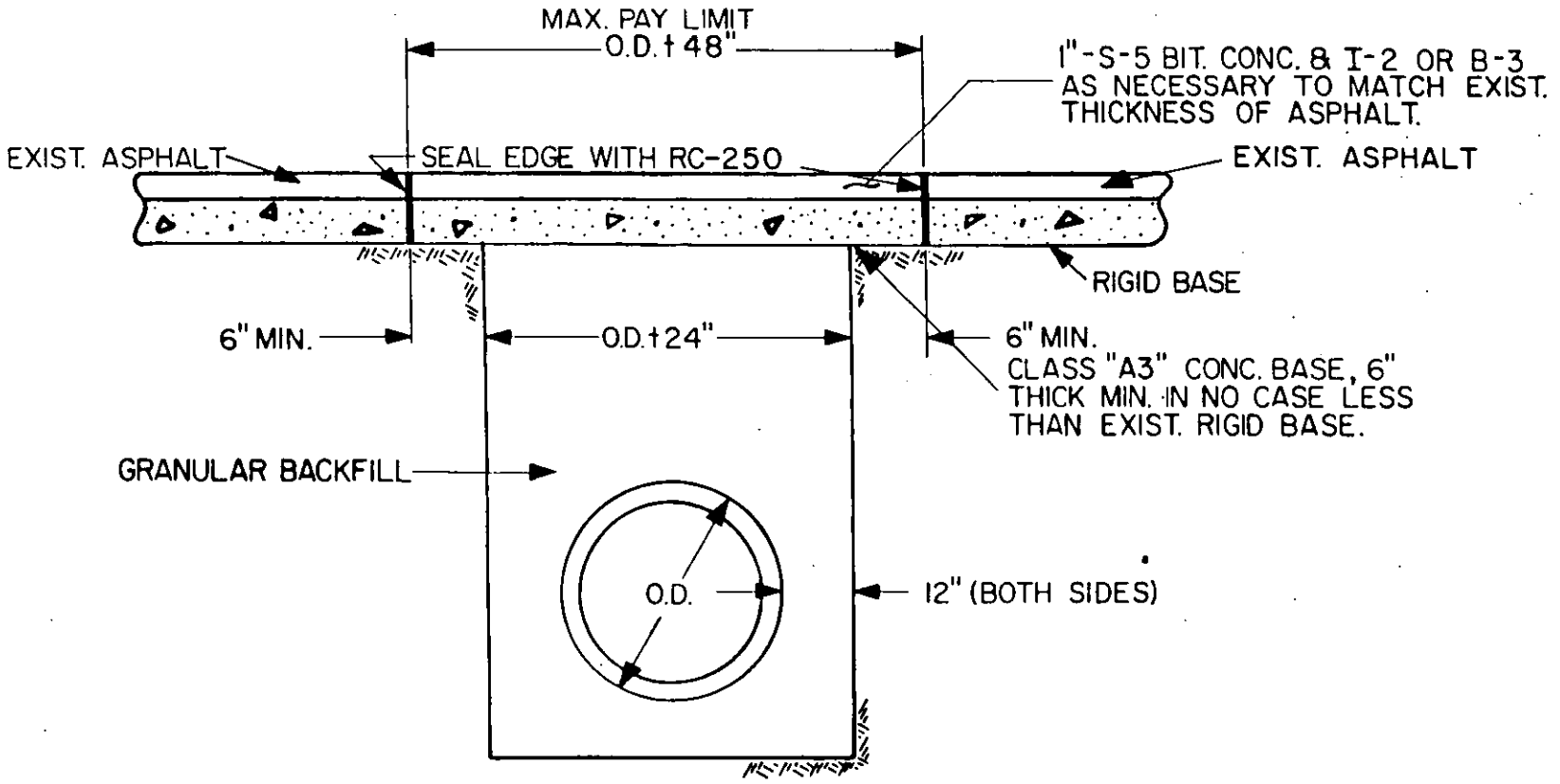
FRAME WEIGHT	200 LBS.
COVER WEIGHT	125 LBS.
TOTAL WEIGHT	325 LBS.

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

MANHOLE FRAME & COVER

CSFC-2



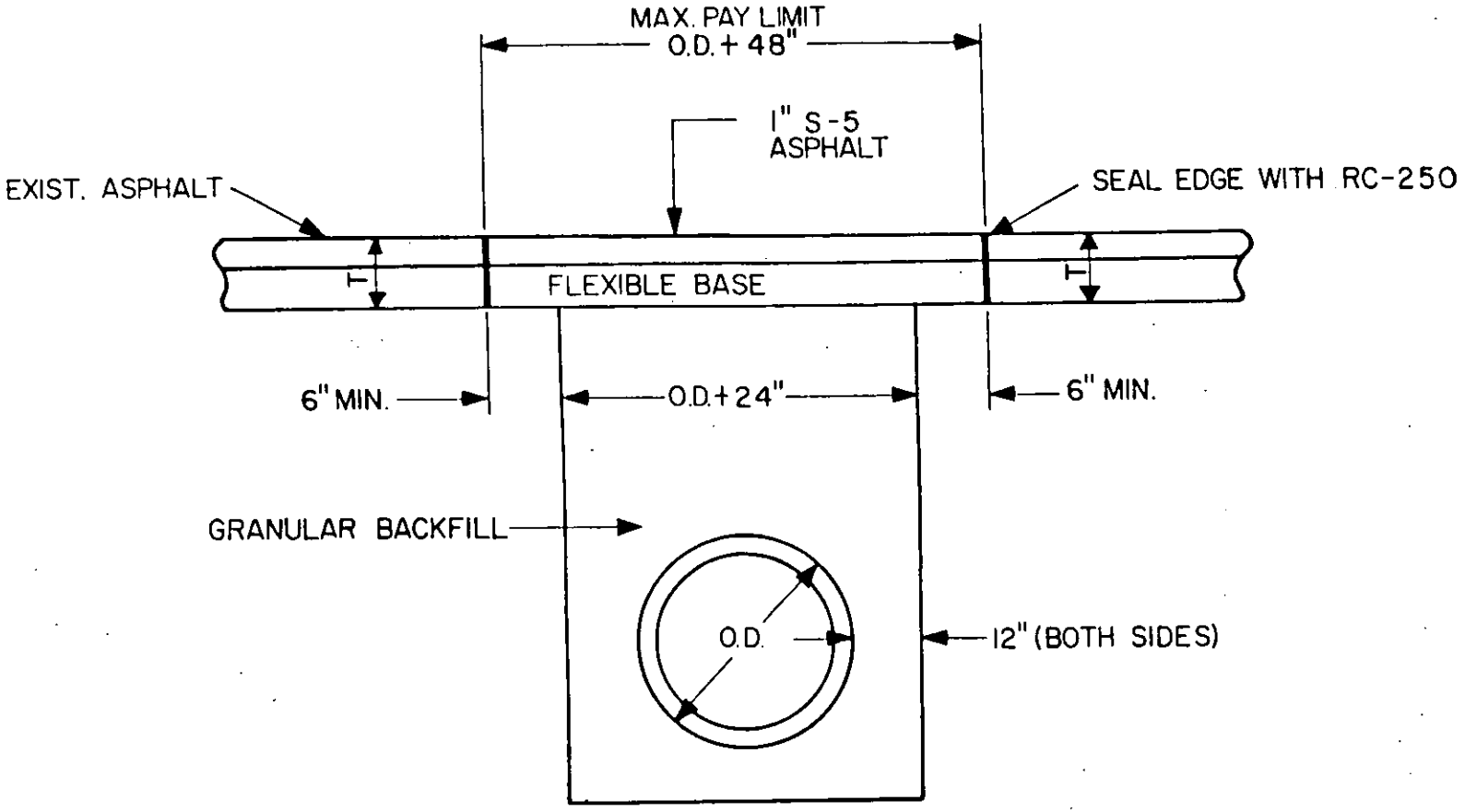
NOTES: 1. RIGID BASE WILL INCLUDE CONC., BRICK OR SOIL CEMENT
2. GRANULAR BACKFILL TO BE TAMPED PER CSJT-1 SPECIFICATIONS

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

REPLACEMENT SURFACE
(RIGID BASE)

CSRS-1 | PAGE 19



NOTES: 1. B-3 ASPHALT BASE COURSE TO BE 1" BELOW EXISTING PAVEMENT SURFACE; 6" OR 'T' MINUS 1" THICK, WHICHEVER IS GREATER. THICKNESS WILL NOT BE LESS THAN EXISTING ASPHALT PAVEMENT.

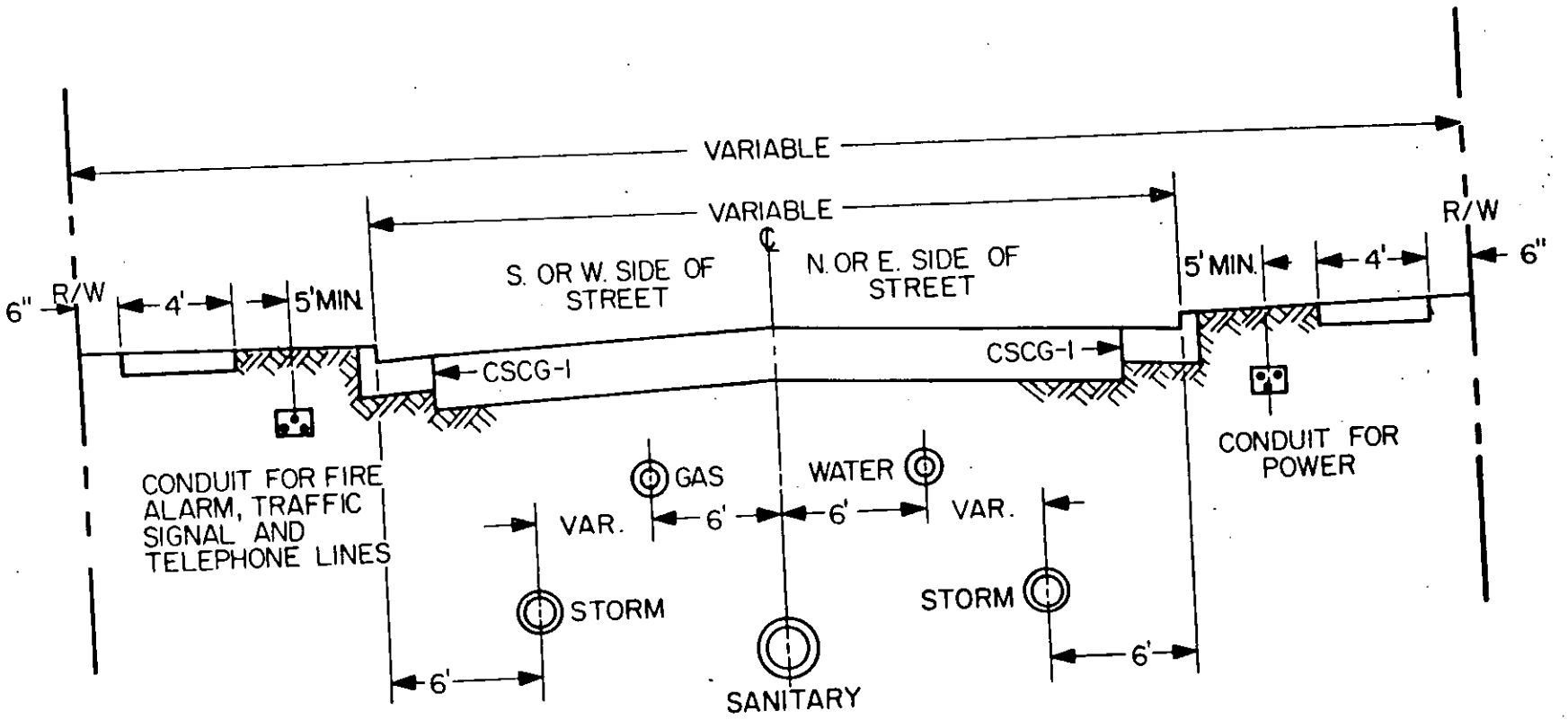
2. GRANULAR BACKFILL TO BE TAMPED PER CSJT-1 SPECIFICATIONS.

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

REPLACEMENT SURFACE
(FLEXIBLE BASE)

CSRS-2



SECTION OF TYPICAL STREET

NOTES: 1. LOCATIONS MAY ONLY BE CHANGED WITH WRITTEN APPROVAL FROM THE CITY ENGINEER.

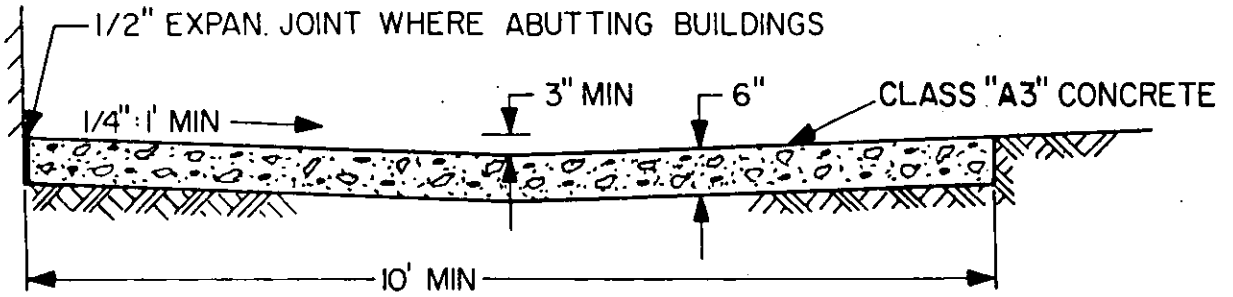
REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT

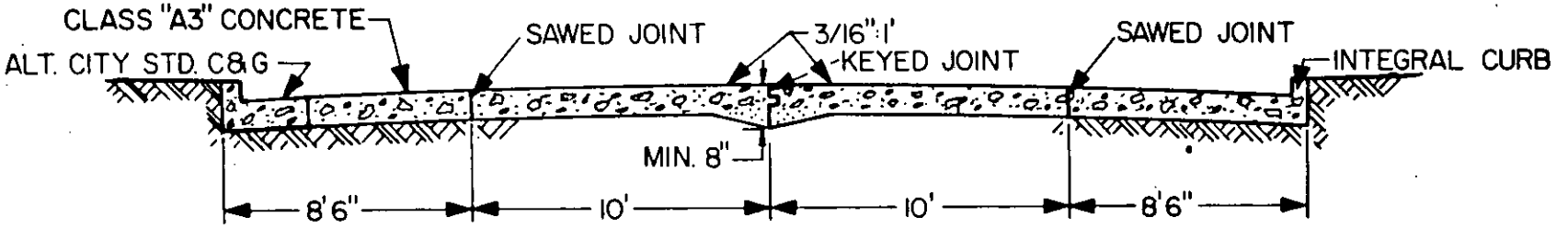
ALEXANDRIA VIRGINIA

STANDARD LOCATION OF SEWERS & UTILITIES

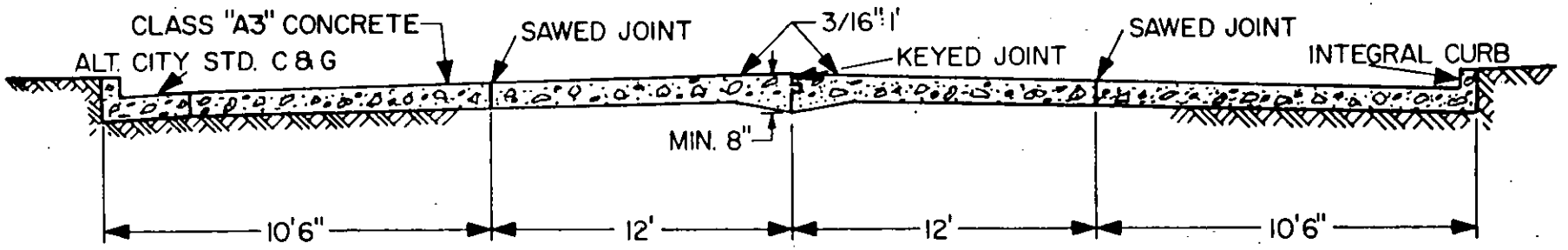
CSSU-1



TYPICAL ALLEY PAVING



36' CONCRETE ROADWAY



44' CONCRETE ROADWAY

NOTES : 1. PAVING THICKNESS AND ANY REINFORCING TO BE SPECIFIED FOR EACH JOB ON THE DESIGN PLANS.

2. INTEGRAL CURB TO BE POURED WITH SLAB, IF SPECIFIED ALT. CITY STD. CURB AND GUTTER MAY BE CONSTRUCTED IN PLACE OF INTEGRAL CURB.

3. LONGITUDIAL JOINTS AT MAX. 18' UNLESS SLAB IS REINFORCED.

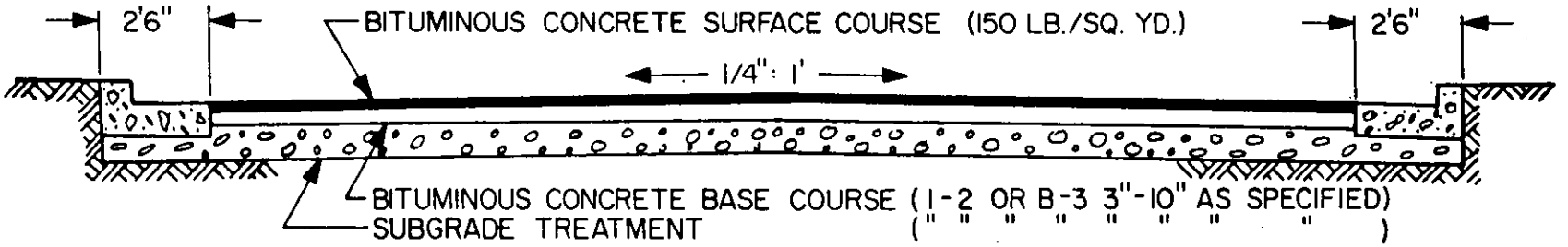
4. SAWED JOINTS TO BE MIN. 1/4 THICKNESS OF SLAB.

REVISIONS:

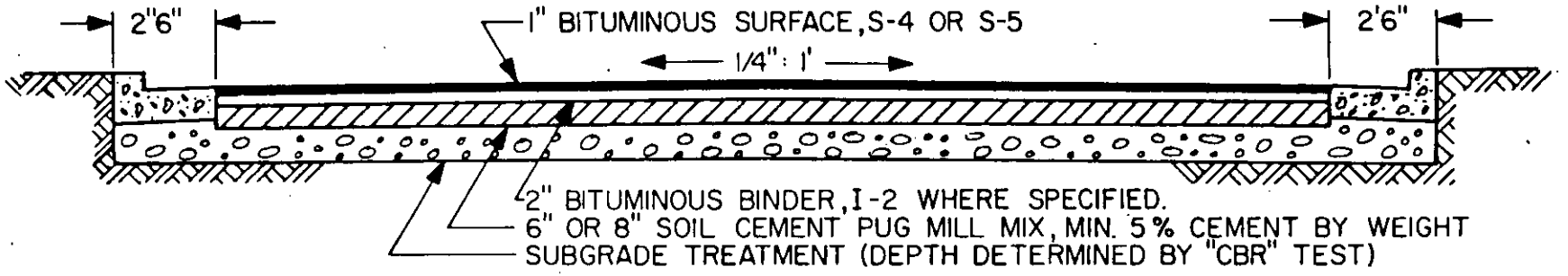
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

CONCRETE PAVING OF ALLEYS & STREETS

CSCP-1



TYPICAL SECTION-FLEXIBLE BASE (ASPHALTIC CONCRETE)



TYPICAL SECTION-RIGID BASE (SOIL CEMENT)

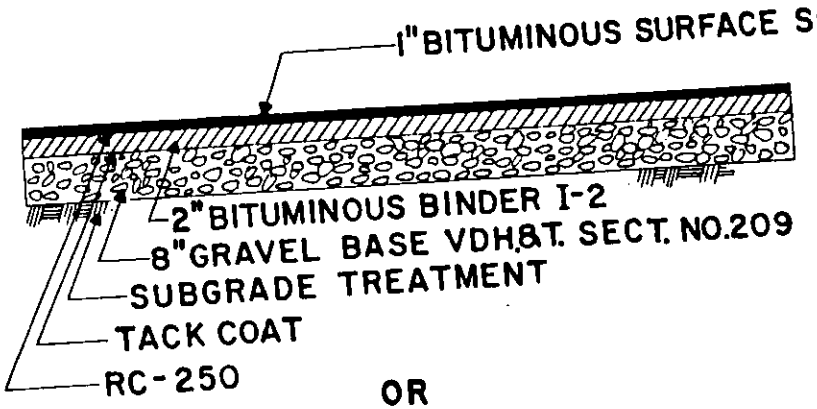
NOTE 1. 12 1/2" MIN. FROM BASE OF SUBGRADE TREATMENT TO SURFACE.

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

ASPHALT PAVING

CSAP-1



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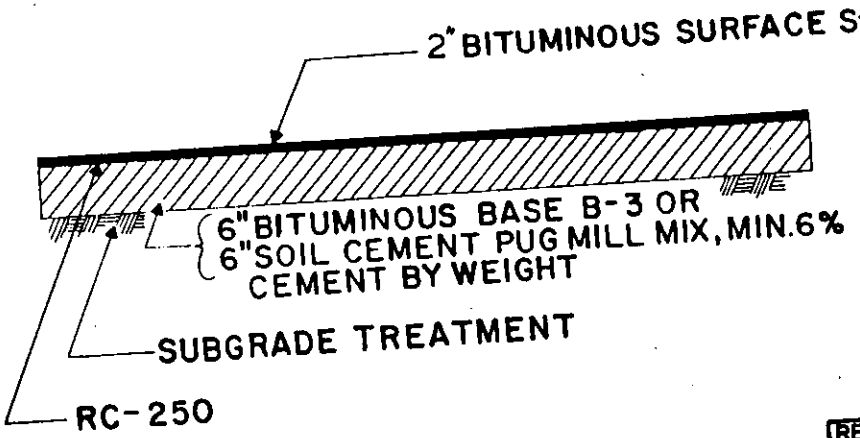


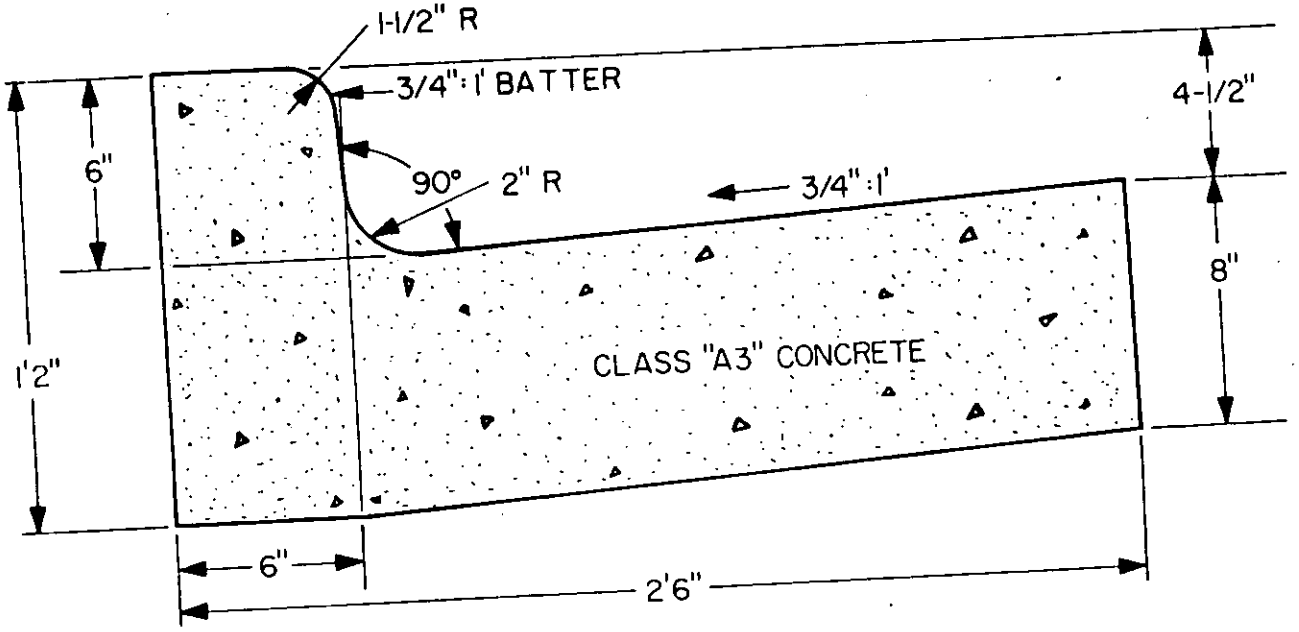
REVISIONS: 4/1/81 Letterman

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT

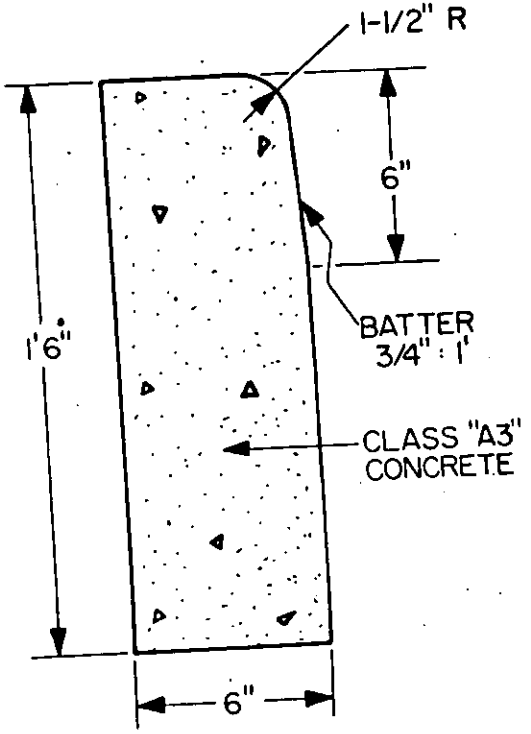
ALEXANDRIA VIRGINIA

ASPHALT PAVING FOR EMERGENCY VEHICLE LANES

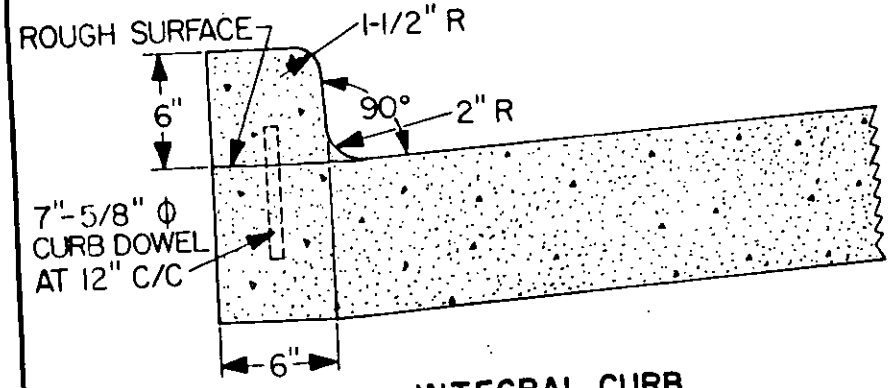
CSAP-1A



COMBINATION CURB AND GUTTER



COPING CURB



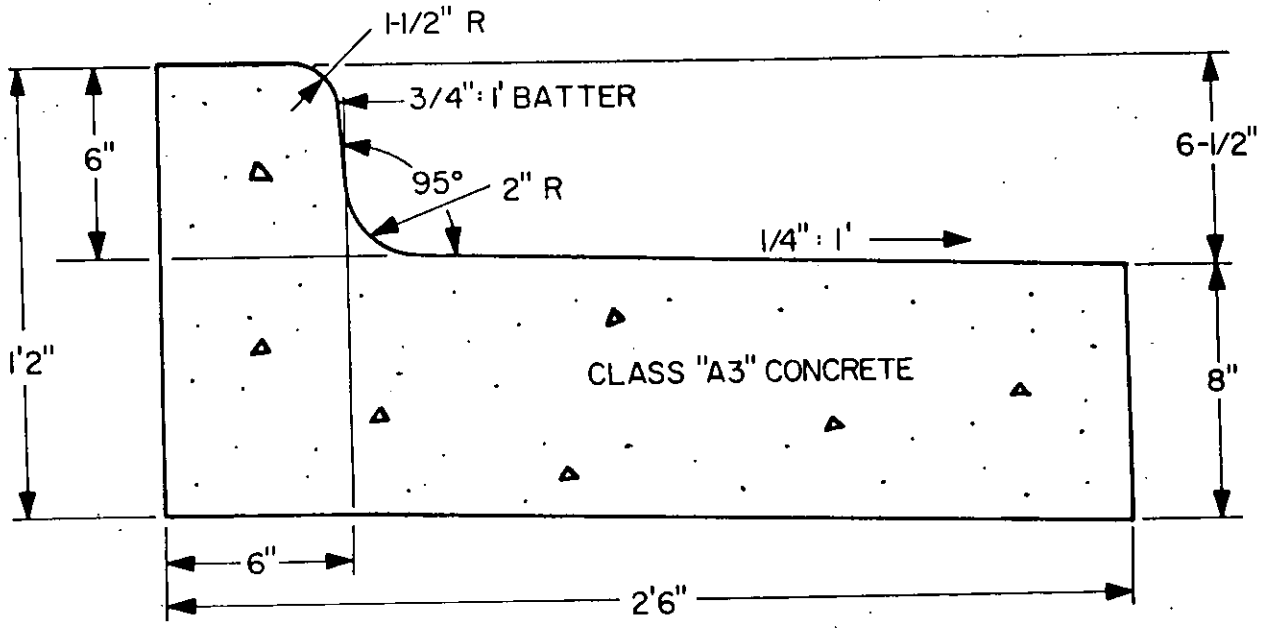
INTEGRAL CURB

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

CURB AND GUTTER AND COPING CURB

CSCG-1



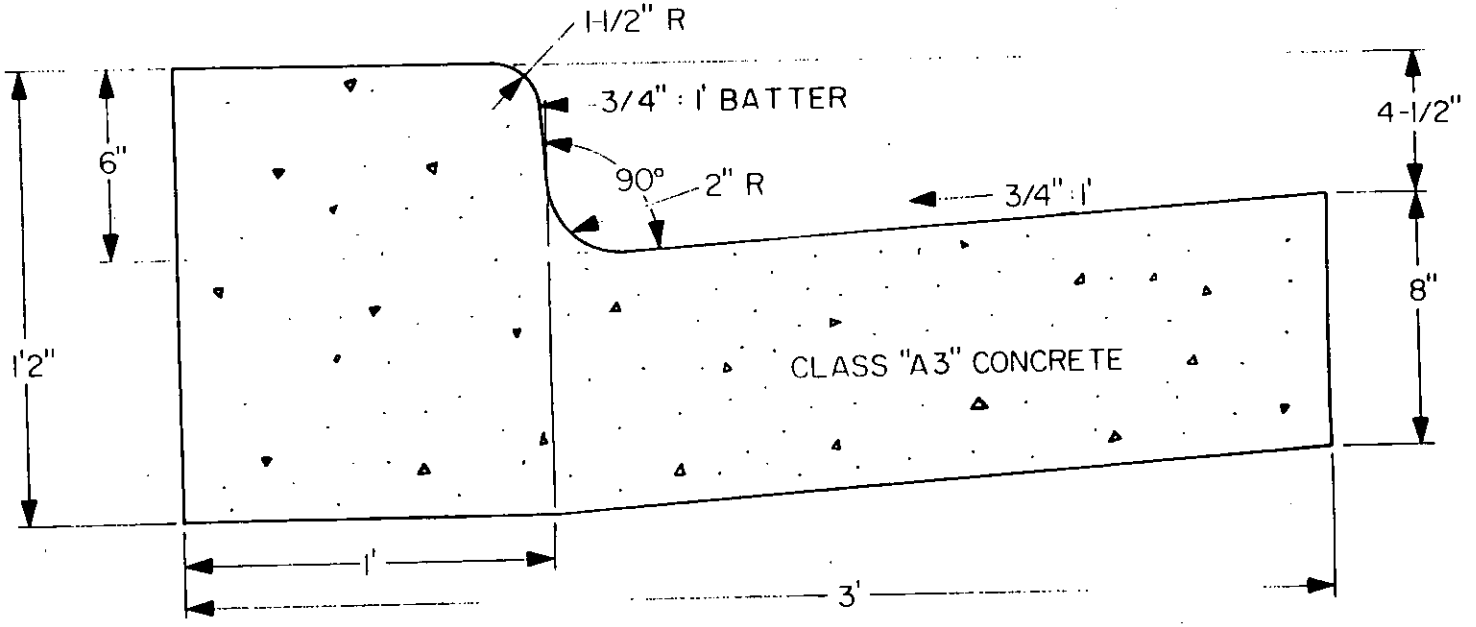
1. USE ONLY AGAINST CONC. PAVEMENT.

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

CURB AND GUTTER
REVERSE FLOW

CSCG-2

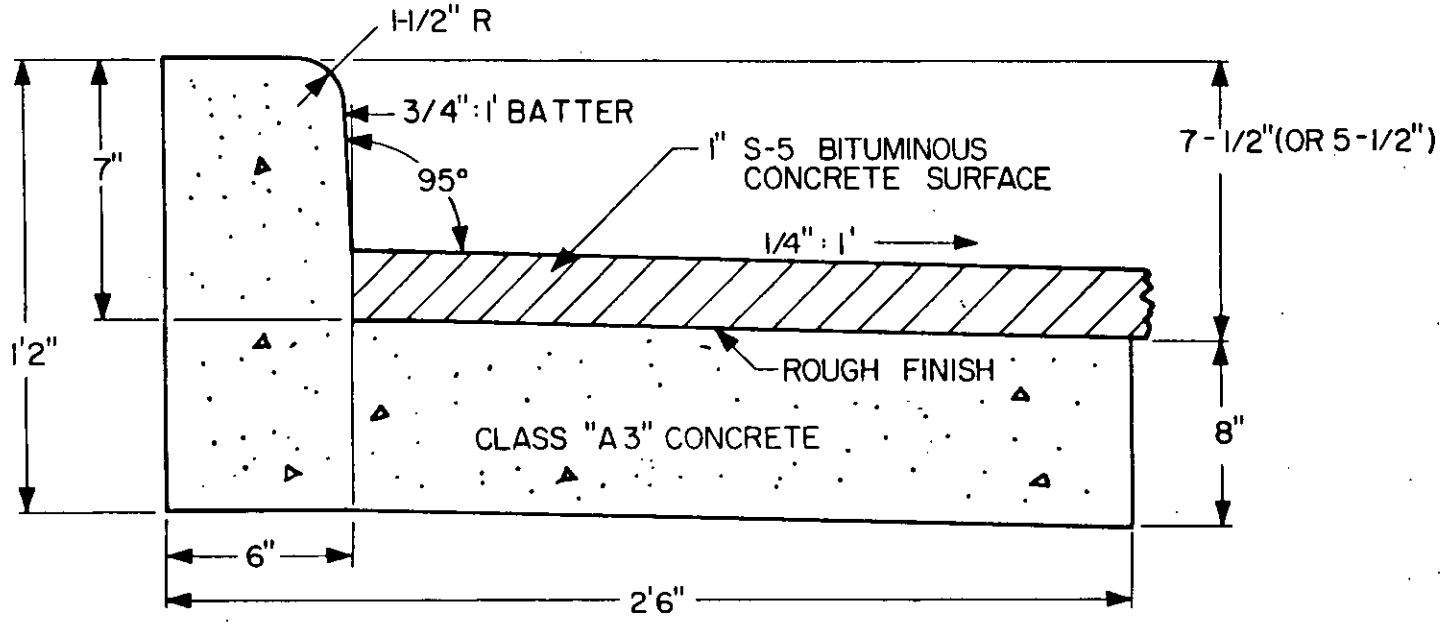


REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

CURB AND GUTTER
ONE FOOT CURB

CSCG-3

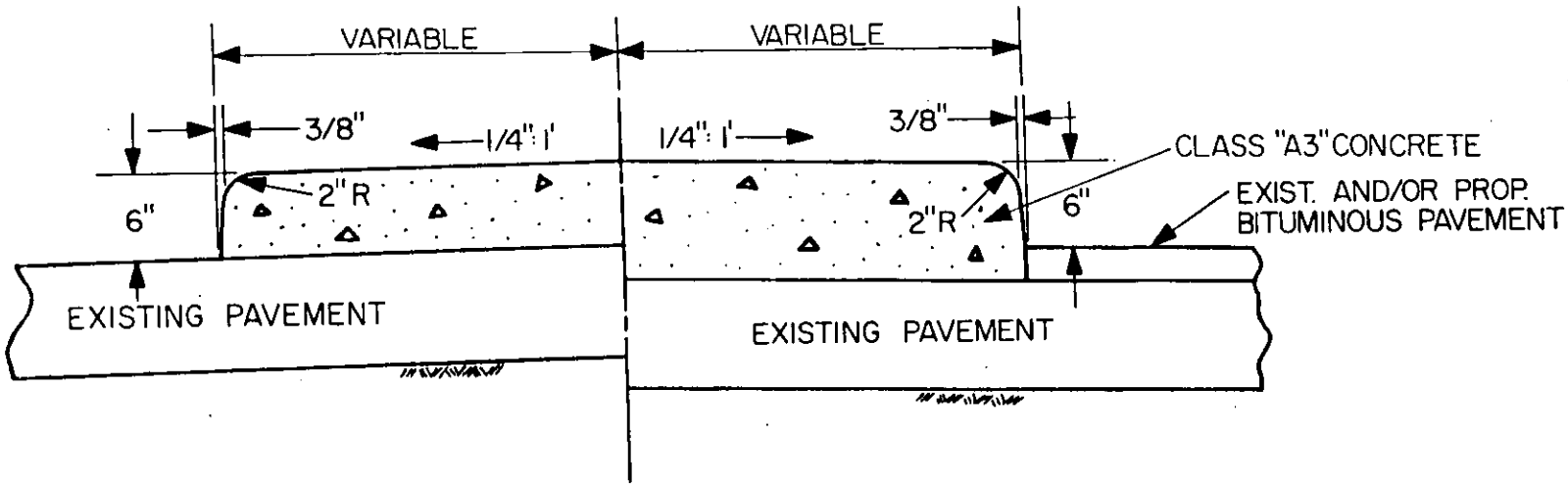


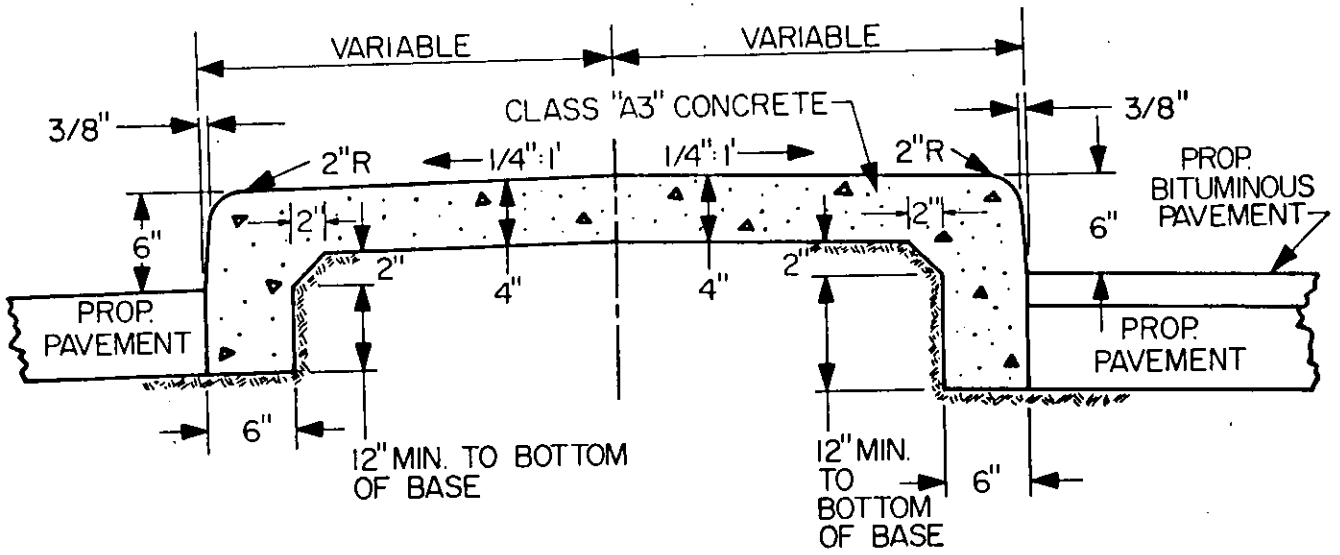
REVISIONS:

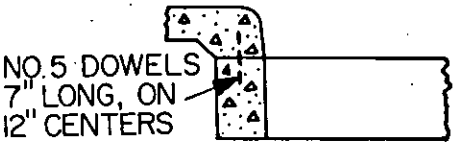
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT - ALEXANDRIA VIRGINIA

CURB AND GUTTER
(SPECIAL DESIGN)

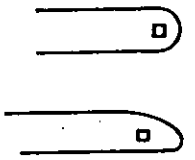
CSCG-4







FOR TOP SLAB POURED SEPARATELY



10" SQUARE HOLE FOR SIGN POST TO BE FORMED INTO INTRODUCED MEDIAN NOSES AT RADIUS POINT OR WHERE WIDTH IS 4' MINIMUM.

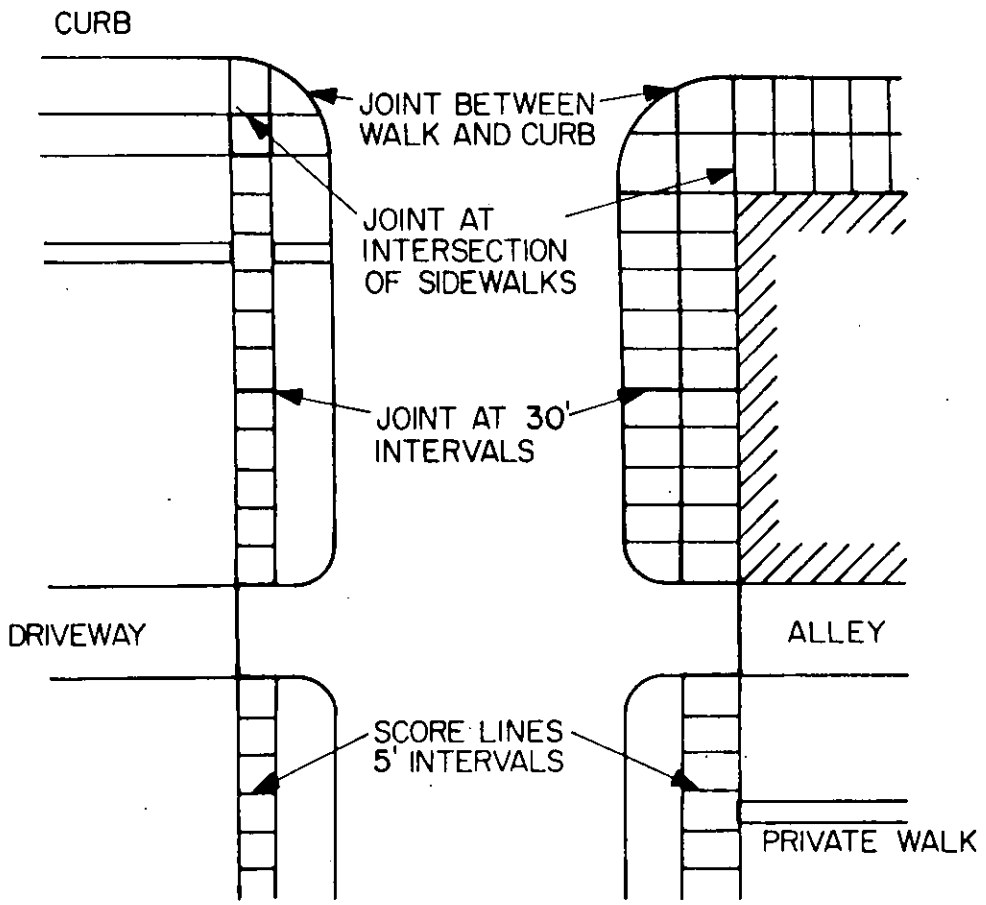
NOTES:
1. GROUND BELOW MEDIAN TO BE COMPACTED TO 95% COMPACTION.
2. EXISTING BITUMINOUS PAVEMENT TO BE REMOVED UNDER MEDIAN.

REVISIONS:

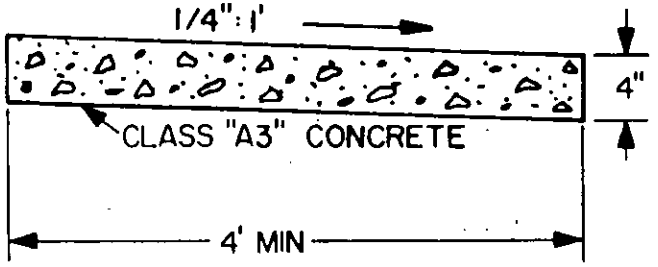
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

CONCRETE MEDIAN

CSCM-1



EXPANSION JOINT PLACEMENT



SIDEWALK SECTION

NOTES: 1. JOINTS ARE OF 1/2" PREMOLDED EXPANSION MATERIAL. PRICE OF MATERIAL TO BE INCLUDED IN COST OF SIDEWALK.

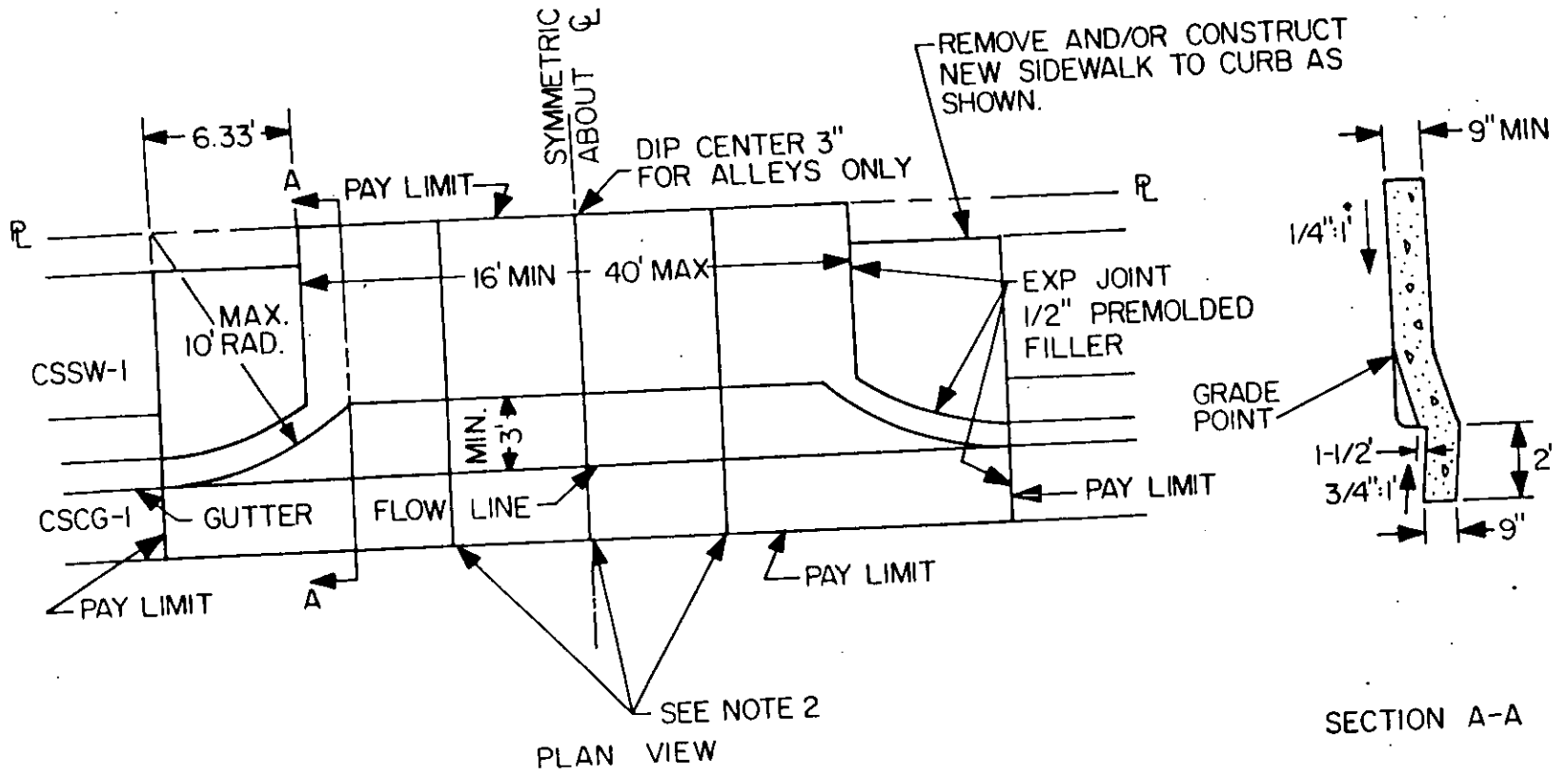
2. SLOPE OF GRASS AREAS WILL BE 1/2" PER 1' MIN.

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

SIDEWALK

CSSW-1



* SLOPE OF GRASS AREAS WILL BE 1/2" IN 1'.

NOTES:
1. ENTRANCE IS POURED MONOLITHIC WITH RADIAL CURB AND FINISHED INTO SMOOTH TRANSITION.
2. PROVIDE KEYED JOINT AT ℄ AND INTERMEDIATE CONTRACTION JOINTS AT 1/4 OF ENTRANCE WIDTH, IF ENTRANCE EXCEEDS 24'.
3. NEW CURB AND SIDEWALK GRADE IS TO CONTINUE THROUGH GRADE POINT AT 1/4":1'.
4. PAY QUANTITIES SQ. YD. COMPLETE.

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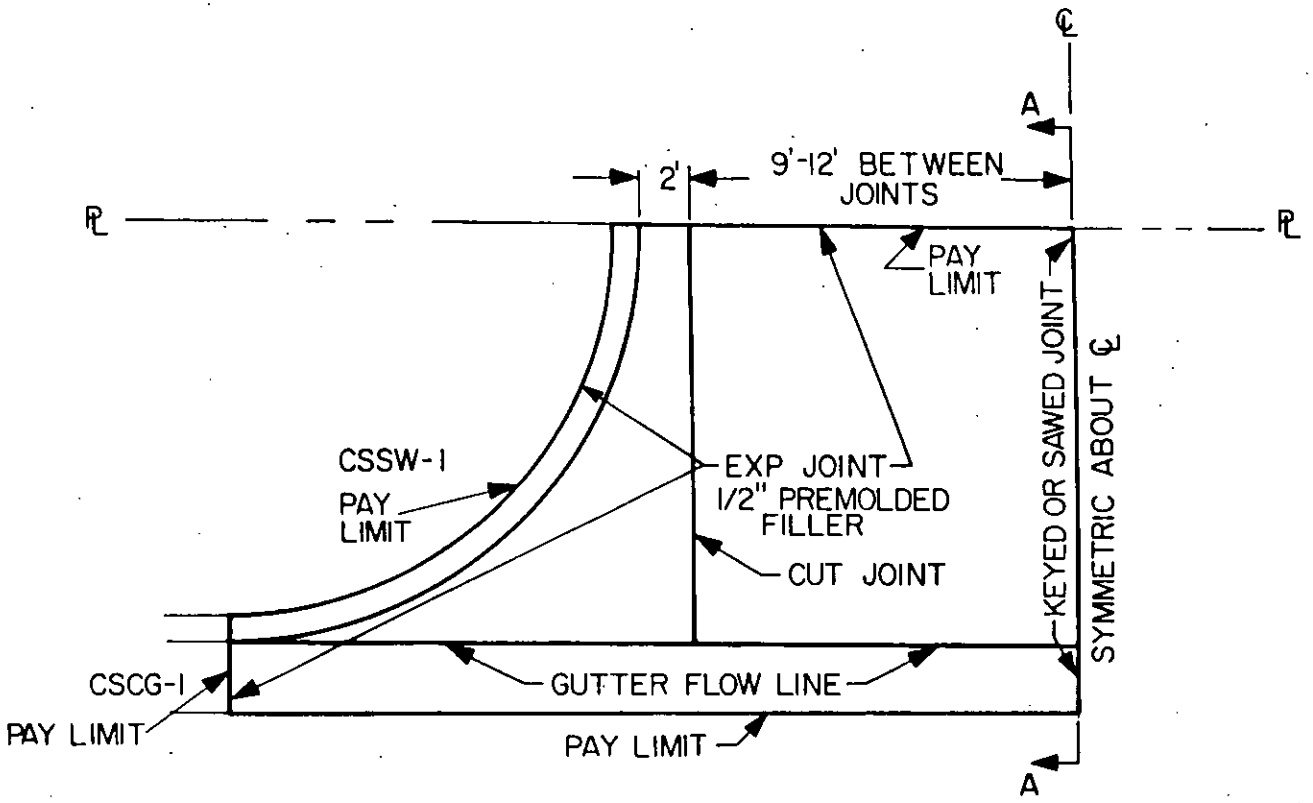
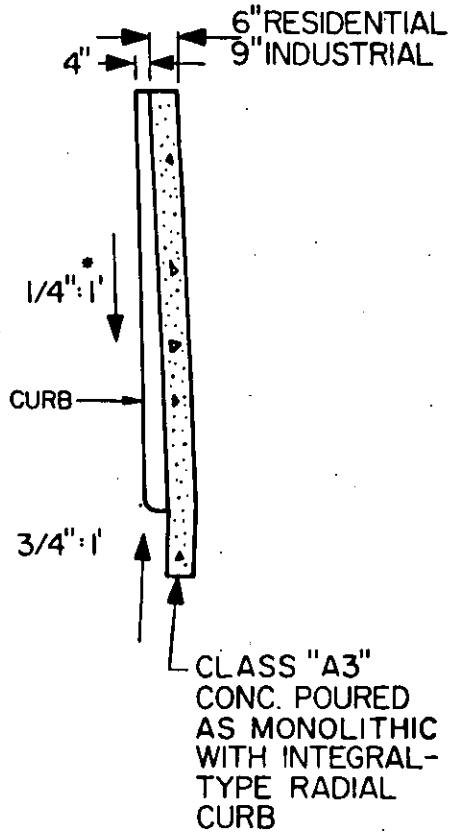
ENTRANCE
INDUSTRIAL

CSEI-1



HALF PLAN



SECTION A-A

*SLOPE OF GRASS AREAS WILL BE 1/2" IN 1'.

NOTES: 1. RETURN RADIUS IS TO BE LARGE ENOUGH THAT RETURN ENDS AT PROPERTY LINE, IF POSSIBLE.
2. ENTRANCE MAY BE OF NORMAL OR INVERTED SECTION WITH CROSS SLOPE OF 3/16".
3. PAY QUANTITIES: SQ. YD. COMPLETE.
4. FOR CSES-1 WITH RAMP FOR THE PHYSICALLY HANDICAPPED SEE CSES-1A PAGE 32.

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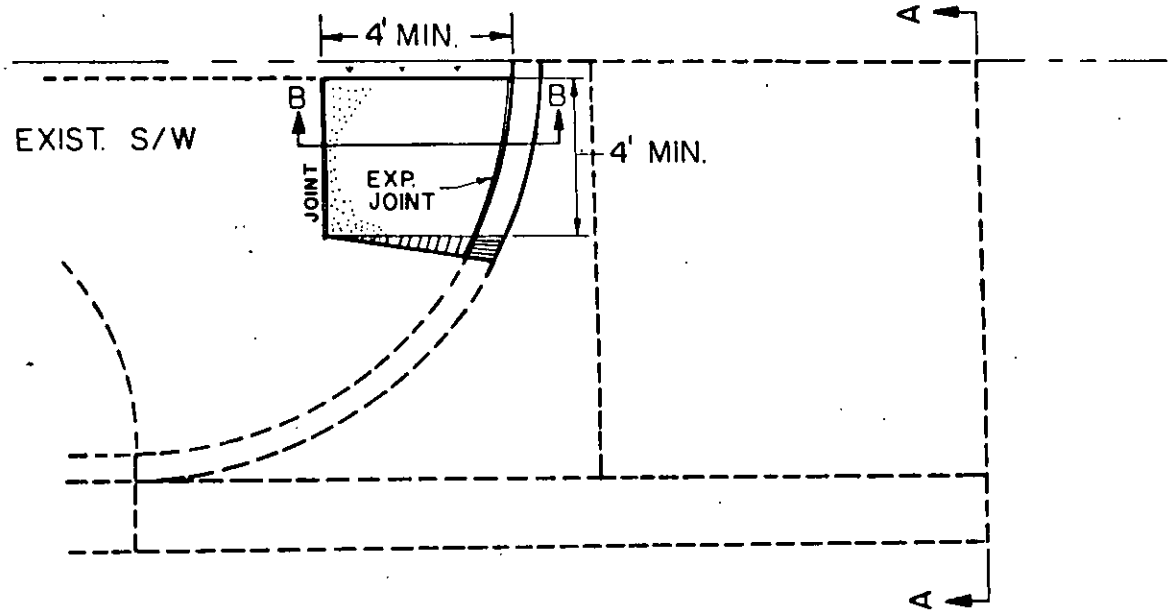
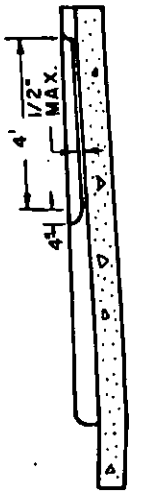
ALEXANDRIA VIRGINIA

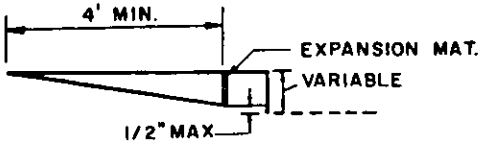
ENTRANCE
SEMI-STREET

CSES-1 | PAGE 31





SECT. A.- A



B-B

NOTE:

1. FOR SEMI-STREET ENTRANCE SPECS. & DETAILS SEE CSES-1.
2. RAMP CAN BE USED WITH CSET-1 PAGE 34.

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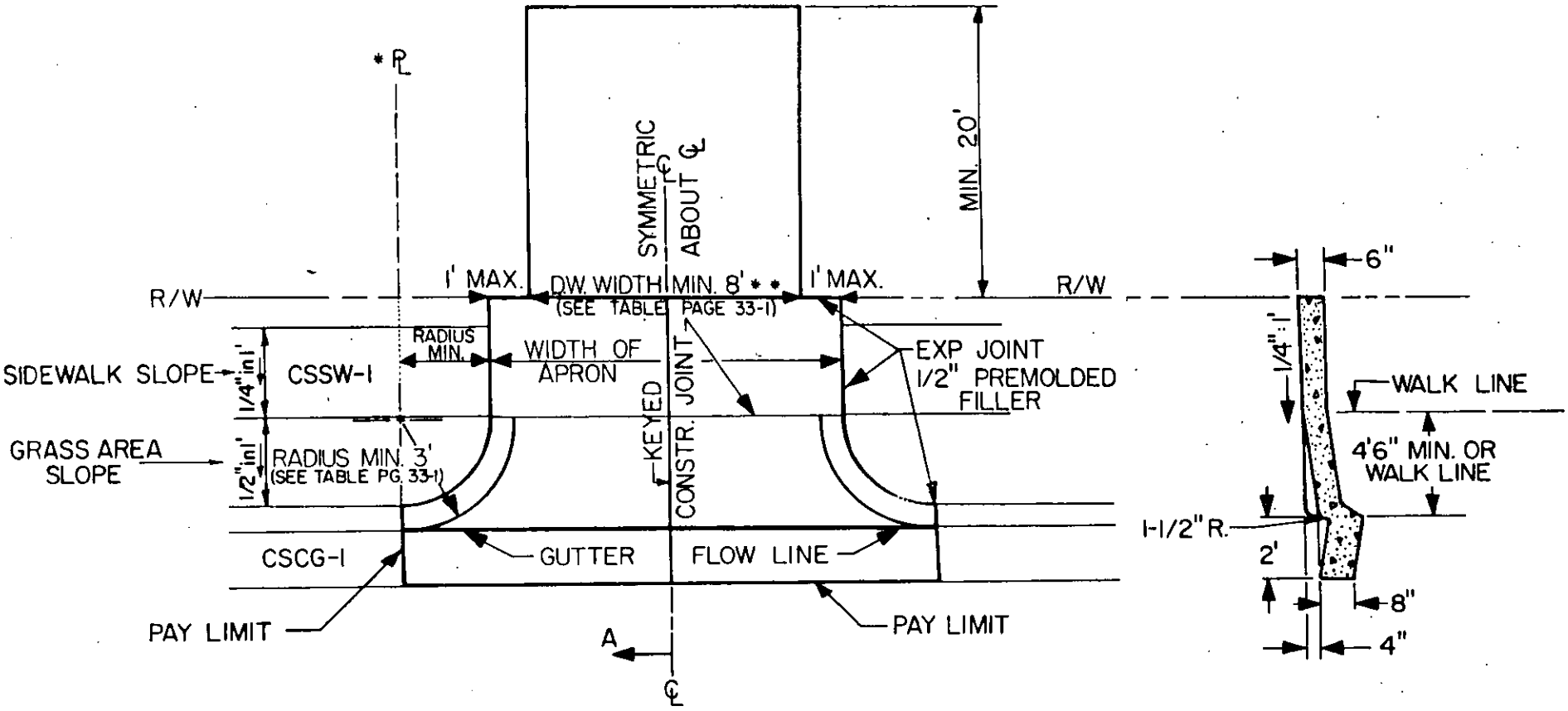
ALEXANDRIA VIRGINIA

ENTRANCE
SEMI-STREET WITH A RAMP
FOR
THE PHYICALLY HANDICAPPED

CSES-1A | PAGE 32



NOTES: 1. DEPRESS SLAB 1-1/2" AT ℄, AND BLEND INTO FLOW LINE.
2. PAY QUANTITIES SQ. YD. COMPLETE.
3. CLASS "A3" CONCRETE
4. PROVIDE INTERMEDIATE CONTRACTION JOINTS AT 1/4 OF ENTRANCE WIDTH, IF ENTRANCE EXCEEDS 12'.

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ALEXANDRIA VIRGINIA

ENTRANCE
RESIDENTIAL RAMP

CSER-1 | PAGE 33

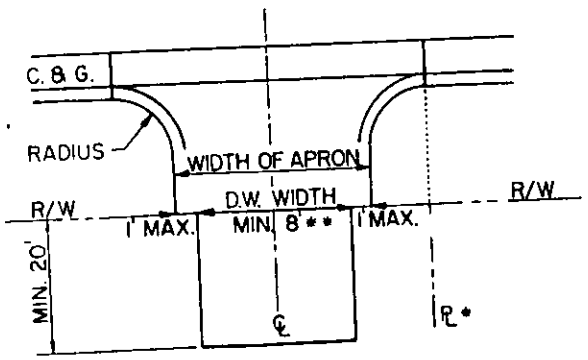
CLASS OF STREET	LOCAL				COLLECTOR				ARTERIAL	
	MINOR		MAJOR		RESIDENTIAL		PRIMARY			
TYPE OF LANE AGAINST CURB	W/ CURB PARK LANE	W/O CURB PARK LANE	W/ CURB PARK LANE	W/O CURB PARK LANE	W/ CURB PARK LANE	W/O CURB PARK LANE	W/ CURB PARK LANE	W/O CURB PARK LANE	W/ CURB PARK LANE	W/O CURB PARK LANE
MIN. WIDTH FT.**	8	9	10	12	9	10	10	12	12	16
MIN. RADIUS FT.*	3	5	5	7	5	7	5	7	7	10

* RADII SHALL BE IN FRONT OF THE PROPERTY SERVED BY THE DRIVEWAY WHENEVER POSSIBLE. JOINT DRIVEWAY MAY BE APPROVED, BUT MIN. WIDTH OF APRON IS REQUIRED ON EACH SIDE OF LOT LINE.

** WIDTH OF DRIVEWAY ON PROPERTY AT END OF APRON MAY NOT BE LESS THAN 8', OR 2' LESS THAN THE ABOVE WIDTH WHICHEVER IS GREATER. WHERE EVEN FURTHER REDUCTION IN WIDTH OF DRIVEWAY IS DESIRED ON LONG DRIVEWAYS A 10 TO 1 MIN. TRANSITION IN WIDTH MUST BE USED TO REACH SAID REDUCED WIDTH.

NOTE: UPON WRITTEN REQUEST TO THE DIRECTOR OF T&ES, VARIANCES FROM THE MINIMUM DRIVEWAY STANDARDS MAY BE GRANTED PROVIDED THAT STRICT APPLICATION OF THE REQUIREMENTS WILL EFFECTIVELY PROHIBIT OR UNREASONABLY RESTRICT THE USE OF THE PROPERTY; AND, PROVIDED THAT SUCH VARIANCE WILL NOT BE OF SUBSTANTIAL DETRIMENT TO ADJACENT PROPERTY. APPLICANT TO NOTIFY ADJACENT PROPERTY OWNERS OF DRIVEWAY REQUEST FOR ALL CURB CUTS AT LEAST 14 DAYS IN ADVANCE OF APPROVAL BY T&ES.

APPEALS FROM DECISIONS OF THE DIRECTOR OF T&ES MAY BE MADE IN WRITING TO THE TRAFFIC & PARKING BOARD BY THE APPLICANT OR AN ADJACENT PROPERTY OWNER OF THE PROPOSED DRIVEWAY.



REVISIONS:

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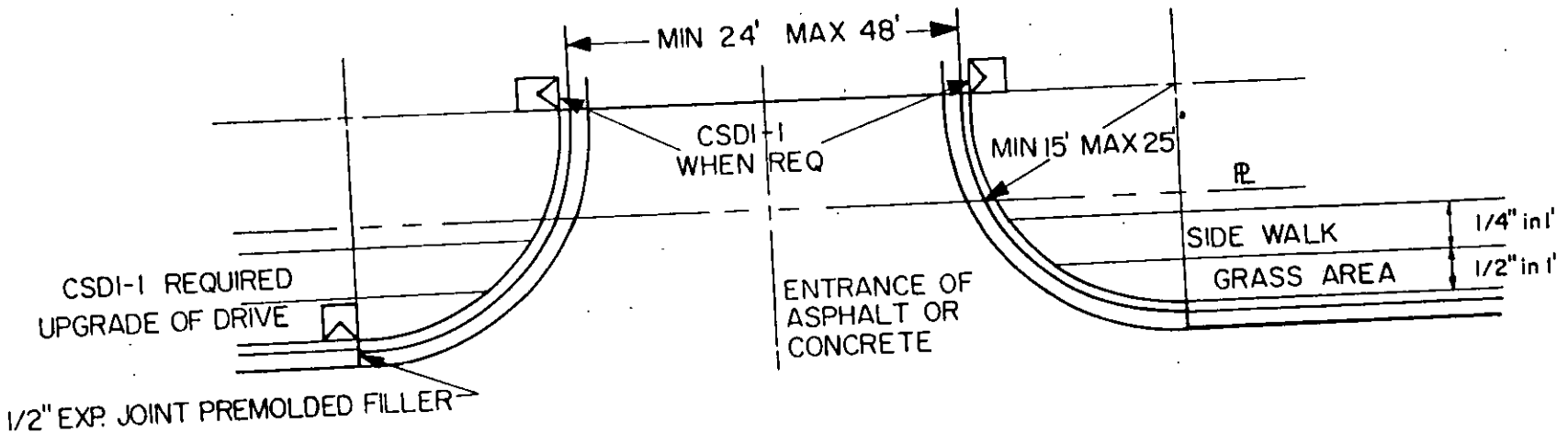
ALEXANDRIA VIRGINIA

RESIDENTIAL CURB CUTS MINIMUM STANDARDS

CSER-1



NOTE:
FOR CSET-1 WITH RAMP FOR THE PHYSICALLY HANDICAPPED SEE CSES-1A PAGE 32.

NOTES: 1. VERTICAL GUTTER FACE IS TO BE HEAVILY COATED WITH ASPHALTIC PAINT BEFORE PAVING IS INSTALLED.
2. ON CONCRETE ENTRANCE, INSTALL CONSTRUCTION JOINTS AT 10' MIN. INTERVALS.

REVISIONS:

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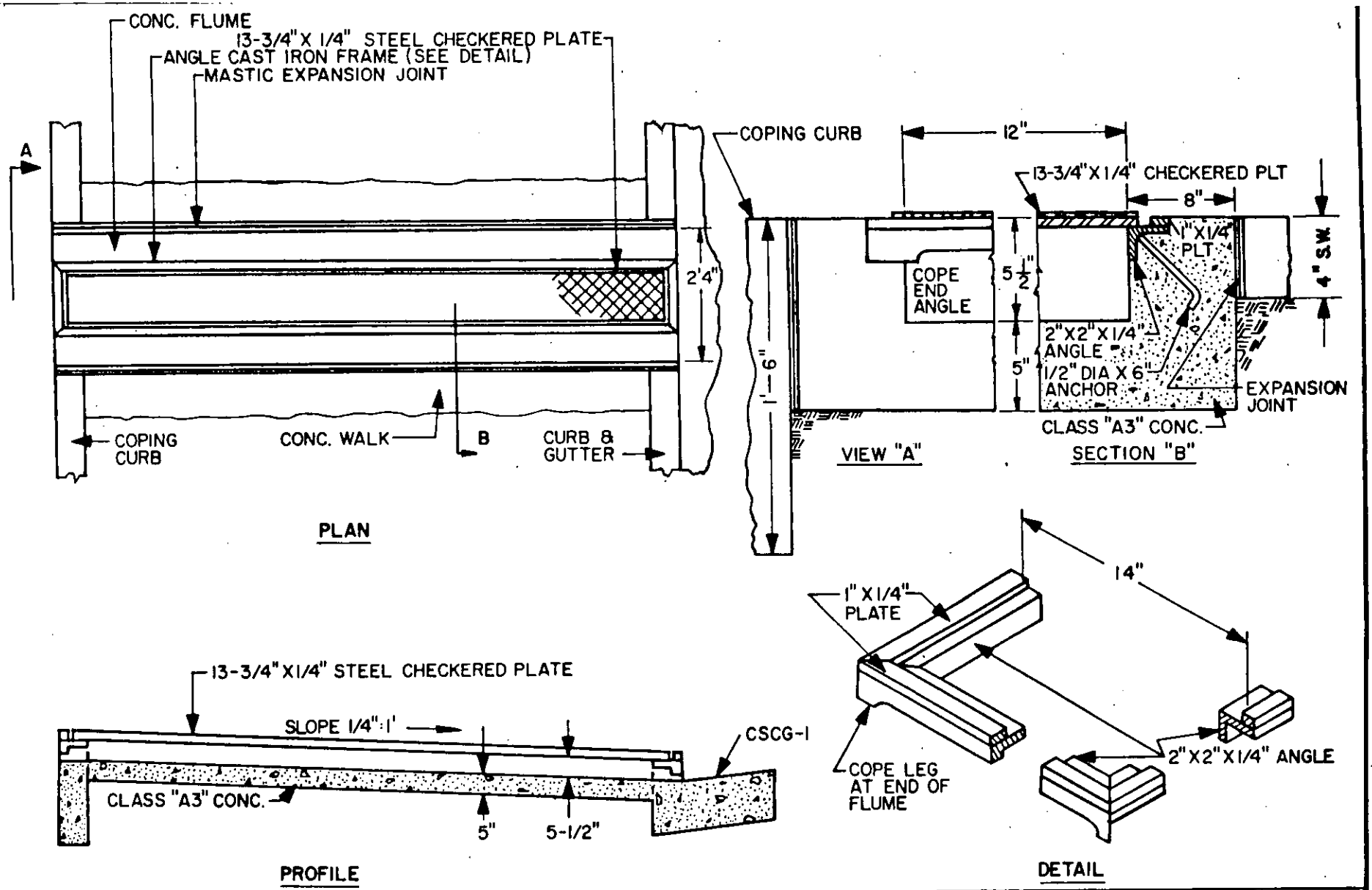
ALEXANDRIA VIRGINIA

ENTRANCE
STREET TYPE

CSET-1



NOTES:
1. FRAME CORNERS ARE MITERED AND WELDED.
2. ALL FRAME PARTS ARE TO BE WELDED INTO A SINGLE UNIT.
3. CHECKERED PLATE IS TO BE REMOVABLE.

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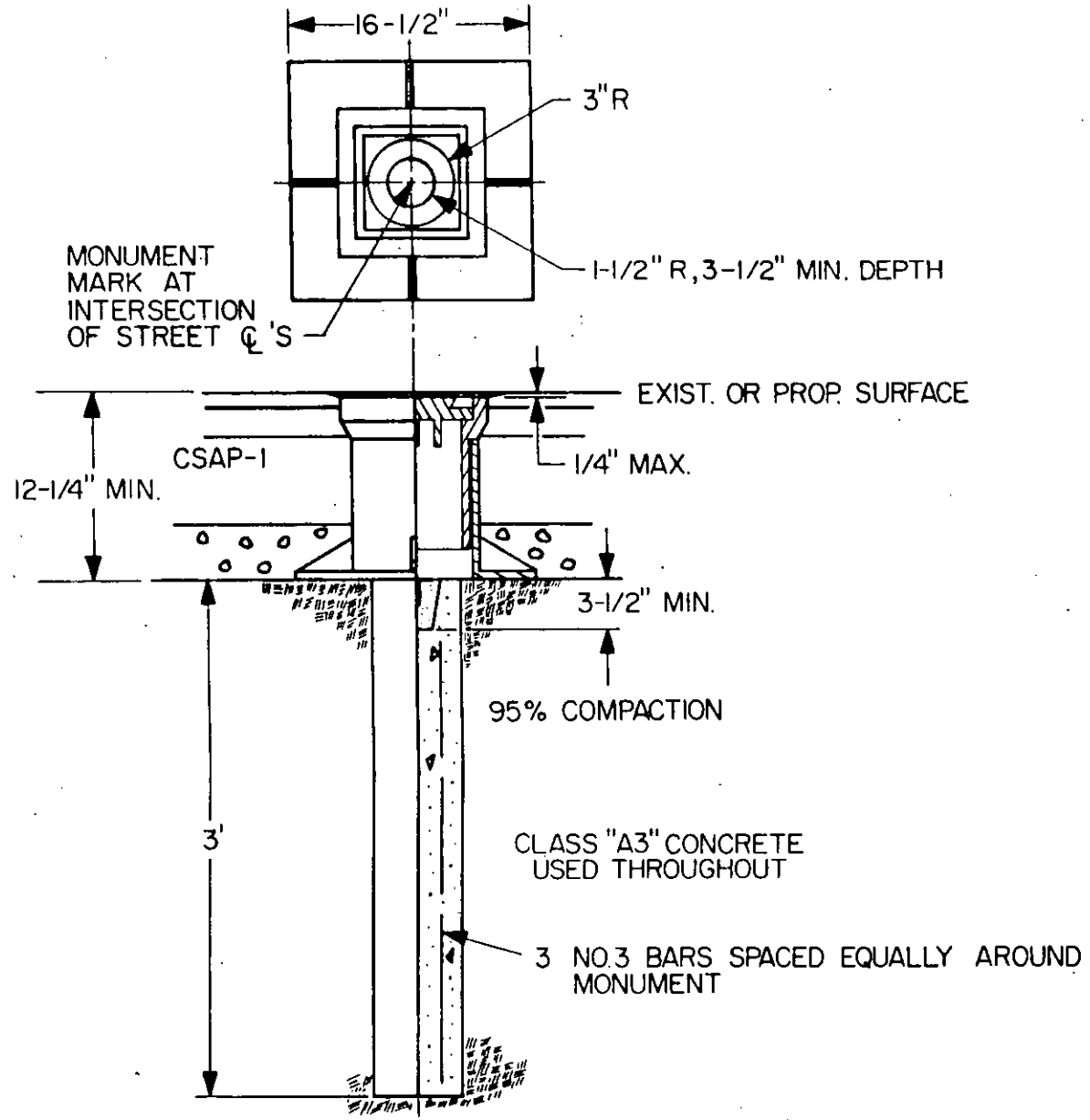
ALEXANDRIA VIRGINIA

SIDEWALK FLUME

CSSF-1



NOTES:
1. SIX IN. DIA. MONUMENT HOLE TO BE DRILLED OR HAND DUG AFTER SUB-GRADE IS IN PLACE AND/OR EXISTING GROUND IS COMPACTED.
2. COST OF CONC. MONUMENT IN PLACE TO BE INCLUDED IN COST OF BOX.
3. MONUMENT BOX NEENAH R-1968 TYPE 36-B OR APPROVED EQUAL.
4. ALL VOIDS IN MONUMENT HOLE TO BE FILLED WITH CLASS "A3" CONC.
5. MONUMENT BOX MUST NOT BEAR ON CONC. MONUMENT.

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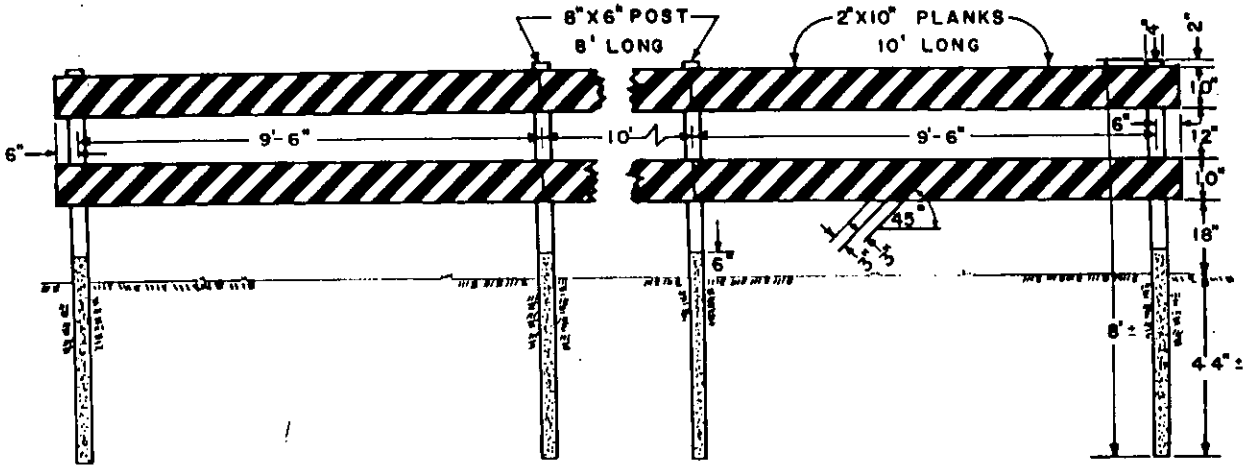
ALEXANDRIA VIRGINIA

MONUMENT
AND MONUMENT BOX

CSMT-1



NOTES

1- THE ENDS OF EACH PLANK ARE TO BE SECURED TO EACH POST WITH 2 - 3/8" X 8 1/2" CARRIAGE BOLTS OR WITH 2- 7/16 IN. X 4 IN. LAG SCREWS WITH WASHERS. BOLTS OR SCREWS TO BE PLACED 2 IN. FROM EDGE OF PLANKS.

2- POST TO BE CREOSOTE OIL TREATED FROM 6" ABOVE GROUND LEVEL TO BOTTOM OF POST. CREOSOTE OIL TO CONFORM TO A.A.S.H.O. SPECIFICATION M133.

3- PLANKS TO BE PAINTED WHITE ALL OVER AND 3" BLACK STRIPES TO BE PAINTED ALTERNATELY, ON ONE SIDE, FOR THE FULL LENGTH OF BARRICADE. POST TO BE PAINTED WHITE ON ALL SIDES, FROM TOP TO WITHIN 6" OF GROUND LEVEL. GOOD QUALITY, OIL BASE, EXTERIOR GRADE PAINT MUST BE USED.

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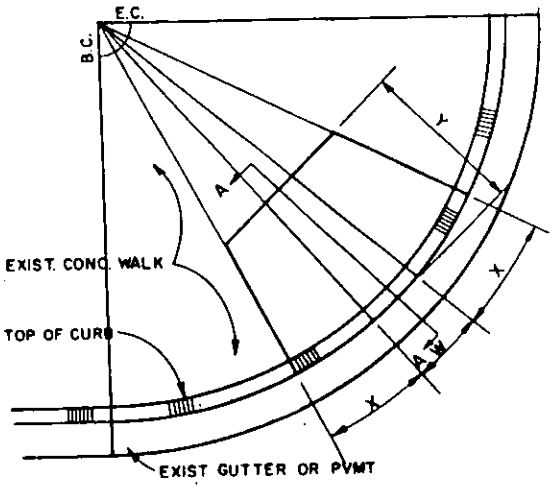
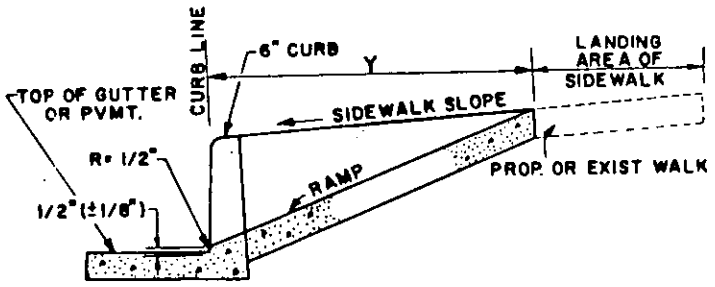
STANDARD TRAFFIC BARRICADE

CSTB-1





SECTION A-A

1. ALL TRANSITIONS MUST BE GRADUAL.
2. AT LOCATIONS OTHER THAN CURB RETURN, THIS RAMP SHOULD BE USED AT MID-BLOCK CROSSWALKS AND CROSSWALKS AT JOGGED INTERSECTIONS ONLY.
3. THE PREFERRED DIMENSIONS ARE:

   W = 4', WHERE THE RAMP NARROWS; MAINTAIN A MINIMUM WIDTH OF 3' AT THE TOP OF THE RAMP.

   Y = 5.5' USE Y DIMENSION SUCH THAT A STANDARD MAXIMUM SLOPE OF 12:1 IS MAINTAINED. IF 12:1 SLOPE DOES NOT FIT, A MINIMUM SLOPE OF 8:1 IS ACCEPTABLE WITHOUT SPECIAL APPROVAL OF THE DIRECTOR.

   X = 6' , MINIMUM DIMENSION OF X = 4' CAN BE USED WITHOUT SPECIAL APPROVAL OF THE DIRECTOR.

4. A LANDING AREA AT THE TOP OF THE RAMP NEED NOT BE PROVIDED. HOWEVER, IN AREAS WHERE AVAILABLE, A LANDING SHOULD BE USED.
5. THE RAMP LIP SHALL BE 1/2" WITH 1/8" ± TOLERANCES.

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TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

CURB RAMPS

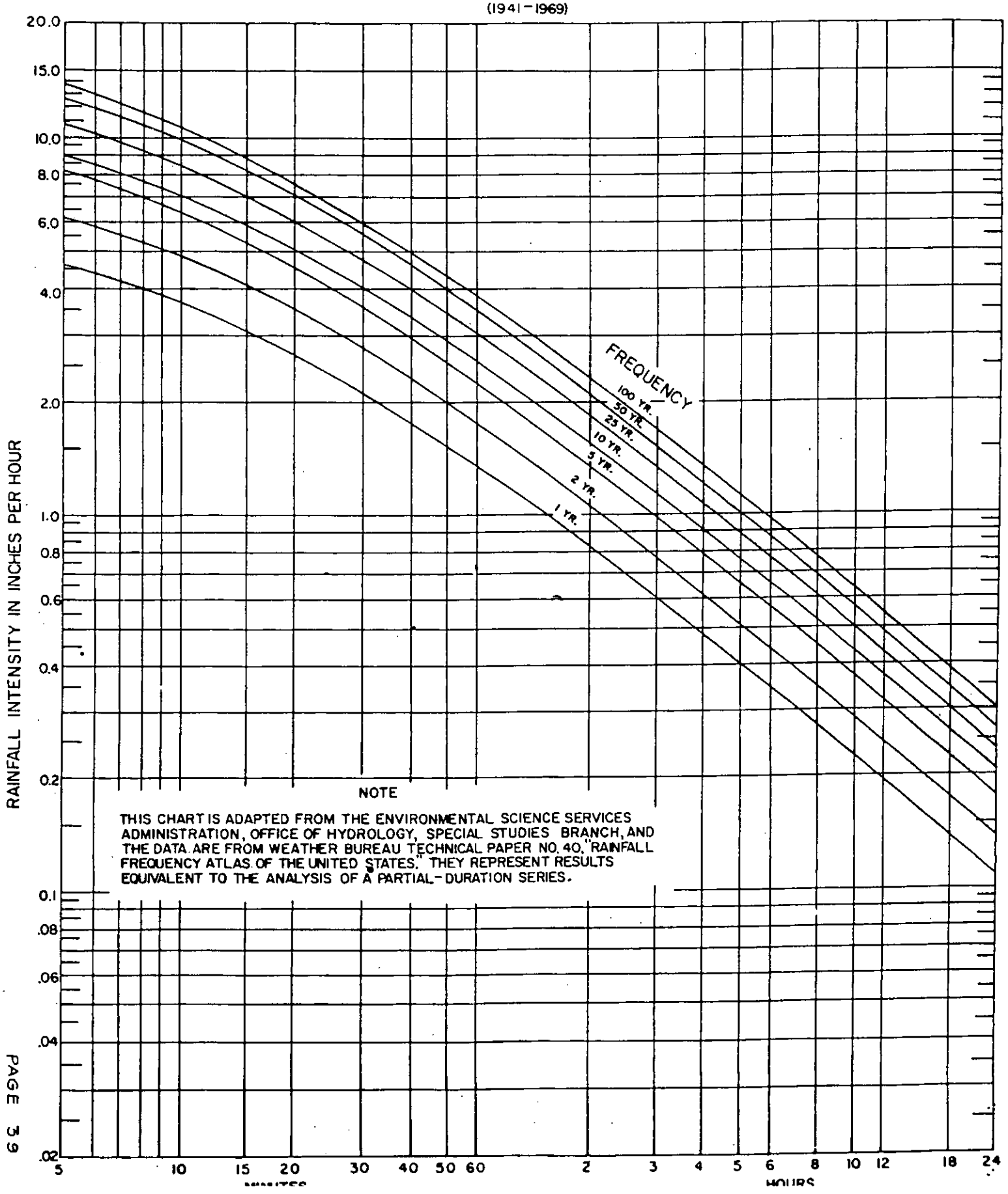
FOR THE PHYSICALLY HANDICAPPED

CSRP-1

CITY OF ALEXANDRIA

RAINFALL INTENSITY — DURATION — FREQUENCY CURVES

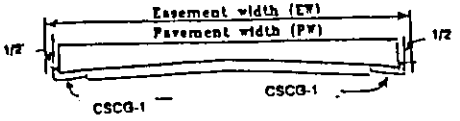
WASHINGTON NATIONAL AIRPORT
38°51' 77°03'
(1941 - 1969)



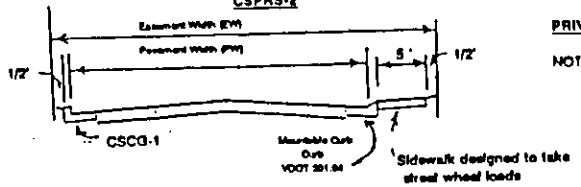
NOTE

THIS CHART IS ADAPTED FROM THE ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION, OFFICE OF HYDROLOGY, SPECIAL STUDIES BRANCH, AND THE DATA ARE FROM WEATHER BUREAU TECHNICAL PAPER NO. 40, "RAINFALL FREQUENCY ATLAS OF THE UNITED STATES." THEY REPRESENT RESULTS EQUIVALENT TO THE ANALYSIS OF A PARTIAL-DURATION SERIES.

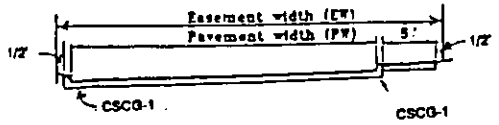
NO SIDEWALKS
CSPRS-1

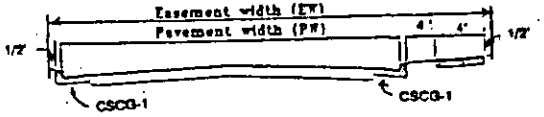


ABUTTING SIDEWALK WITH MOUNTABLE CURB
CSPRS-2

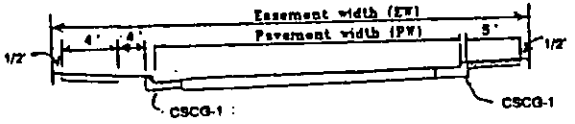


ABUTTING SIDEWALK ONE SIDE
CSPRS-3

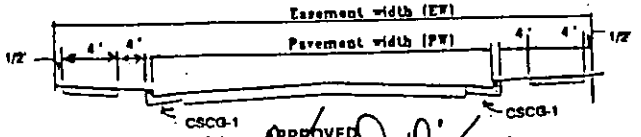




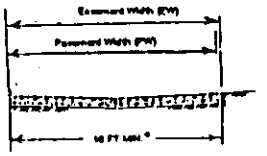
GRASS STRIP AND SIDEWALK ONE SIDE
CSPRS-4



ABUTTING SIDEWALK ONE SIDE AND GRASS STRIP SIDEWALK ONE SIDE
CSPRS-5



GRASS STRIP AND SIDEWALK TWO SIDES
CSPRS-6



TYPICAL ALLEY PAVEMENT

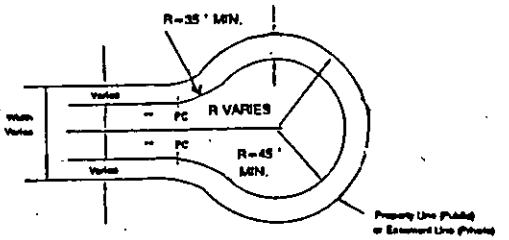
*20' in commercial & industrial areas

PRIVATE ALLEY (CSPRA-1 & CSPRA-2)

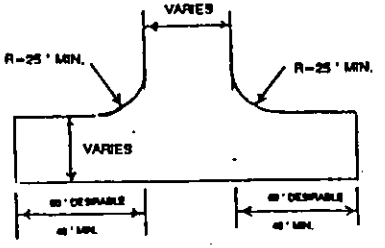
NOTES: 1. MAY NOT BE USED TO MEET STREET FRONTAGE REQUIREMENTS.
2.. MAY BE USED TO PROVIDE ACCESS TO GARAGE OR ENCLOSED PARKING ONLY IF DISTANCE FROM EDGE OF EASEMENT TO GARAGE OR ENCLOSED PARKING IS A MINIMUM OF 20 FEET.

PRIVATE STREET STANDARD NUMBER	MINIMUM DIMENSIONS					
	NO PARKING		PARKING ONE SIDE		PARKING BOTH SIDES	
	PW*	EW	PW*	EW	PW*	EW
CSPRS - 1**	26'	26'	N.A.	N.A.	N.A.	N.A.
CSPRS - 2	24'	31'	N.A.	N.A.	N.A.	N.A.
CSPRS - 3	26'	33'	30'	31'	N.A.	N.A.
CSPRS - 4	26'	36'	30'	40'	N.A.	N.A.
CSPRS - 5	26'	41'	30	45	36	51
CSPRS - 6	26	44	30	48	36	54
CSPAS - 1***	20'	20'	N.A.	N.A.	N.A.	N.A.
CSPAS - 2	10'	20'	N.A.	N.A.	N.A.	N.A.

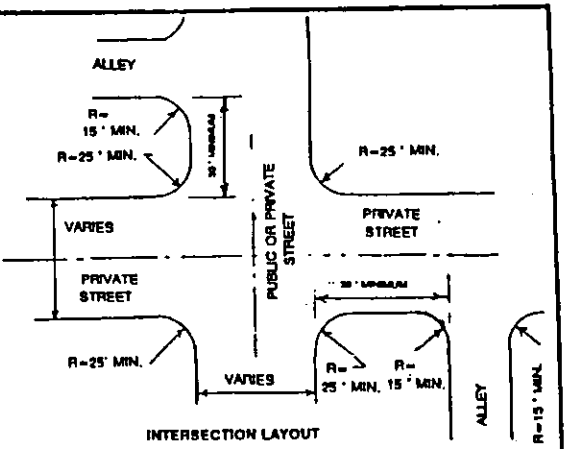
* FRONT FACE OF CURB TO FRONT FACE OF CURB AT THE GUTTER
** MAXIMUM "NO EXIT" LENGTH = 150 FEET OR SERVING 16 RESIDENTIAL UNITS
*** IN COMMERCIAL AND INDUSTRIAL ZONES



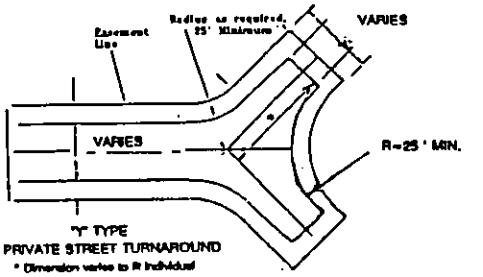
CUL-DE-SAC
PRIVATE STREET TURNAROUND



HAMMERHEAD
PRIVATE STREET TURNAROUND



INTERSECTION LAYOUT



"Y" TYPE
PRIVATE STREET TURNAROUND
* Dimension varies to fit individual plan - 60 Foot minimum

GENERAL NOTES:
1. ALL TRAVELWAYS TO CARRY EMERGENCY VEHICLES OR PUBLIC TRASH SERVICE MUST BE BUILT TO MINIMUM STREET STANDARDS CSPRS-1 THROUGH CSPRS-6 AND HAVE TURNAROUNDS.
2. ALL EMERGENCY VEHICLE EASEMENTS MUST CONFORM TO CSAP-1A OR BETTER.

APPROVED
April 95 — Thomas T. O'Kane Jr.
DATE — DIRECTOR, TRANSPORTATION AND ENVIRONMENTAL SERVICES

REVISIONS:

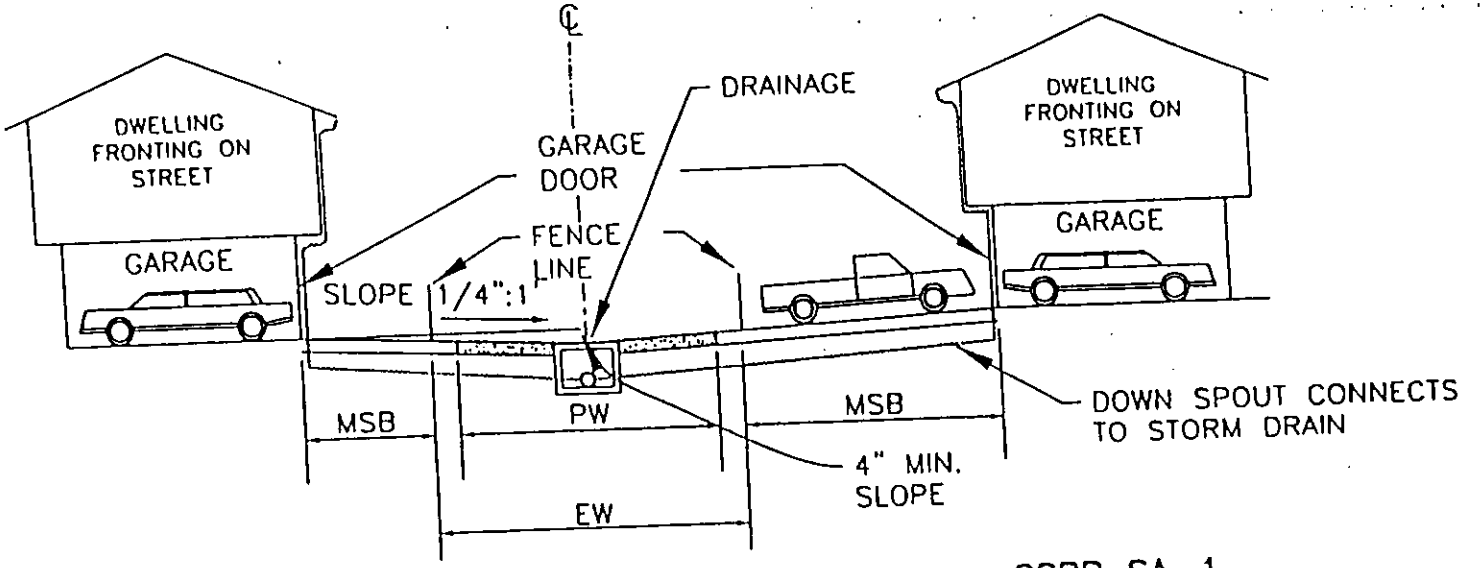
TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT
ALEXANDRIA VIRGINIA

MINIMUM STANDARDS FOR PRIVATE STREETS AND ALLEYS

CSPRS-1 - CSPRS-6 & CSPRA-1 - CSPRA-2 | PAGE 40

RESIDENTIAL REAR SERVICE ALLEY STANDARDS

(MUST BE USED ON ALL NEW RESIDENTIAL DEVELOPMENT PROJECTS WHERE VEHICULAR ACCESS IS FROM THE REAR)



CSRR SA-2

ALL REQUIRED PARKING IN GARAGE (NO PARKING IN ALLEY)

CSRR SA-1

REQUIRED PARKING IN DRIVEWAY AND GARAGE (NO PARKING IN ALLEY)

RESIDENTIAL REAR SERVICE ALLEY STANDARD	MINIMUM WIDTHS					
	TWO - WAY TRAFFIC FLOW			ONE - WAY TRAFFIC FLOW		
	PW	EW	MSB	PW	EW	MSB
CSRR SA-1	22'	24'	20'	18'	20'	20'
CSRR SA-2	22'	24'	10'	18'	20'	10'

NOTES:
1. MINIMUM RADII WHERE ALLEYS MEET STREETS OR OTHER ALLEYS = 15'.
2. ALLEY GUTTER MAY BE ADJUSTED OFF CENTER TO MATCH TERRAIN.
3. (MSB) = MINIMUM SET BACK.
4. (EW) = EASEMENT WIDTH.
5. (PW) = PAVEMENT WIDTH.

5 Feb. '98 — APPROVED: Thomas F. O'Kane Jr.
DATE — DIRECTOR, TRANSPORTATION AND ENVIRONMENTAL SERVICES

REVISIONS:

TRANSPORTATION & ENVIRONMENTAL SERVICES DEPARTMENT

ALEXANDRIA VIRGINIA

RESIDENTIAL REAR SERVICE ALLEY STANDARDS

CSRR SA-2 & CSRR SA-1 | PAGE 41